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NATURAL RESOURCES CANADA

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VOL. 8

JULY, 1929

CANADA APPROVES OF NIAGARA FALLS IMPROVEMENT PLAN

PARLIAMENT RATIFIES CONVENTION

Remedial Works Recommended Will Preserve and Enhance Beauty of Spectacle

The Convention and Protocol in regard to Niagara falls entered into between the Governments of Canada and the United States has been ratified by the Dominion Parliament and awaits similar action by the United States Senate. It represents the culmination of studies initiated some years ago by the Department of the Interior, Canada.

The Canadian or Horseshoe falls at Niagara have been progressively receding upstream and during the last 125 years have receded at an average rate of 3.7 feet per year—the maximum rate taking place in the notch of the Horseshoe falls. This recession, in conjunction with the extremely low flows culminating in 1926 in the lowest flow recorded in sixty-seven years, and with the withdrawal of water for power purposes, had left bare the flanks of the Canadian falls and materially thinned out the flow over the United States falls to the very serious detriment of the scenic beauty of the spectacle as a whole.

The concern of the two Governments regarding the effect of erosion and water diversion for power purposes on the scenic values of the falls led to an exchange of views and the appointment of a Special International Niagara Board consisting on the one hand of J. T. Johnston, C.E., Director of Dominion Water Power and Reclamation Service of the Department of the Interior, and Charles Camsell, LL.D., F.R.S.C., Deputy Minister of Mines, for Canada; and on the other of Major Dewitt C. Jones of the Corps of Engineers of the United States Army, District Engineer at Buffalo, and J. Horace McFarland, L.H.D., Past President of the American Civic Association and Chairman of the Fine Arts Commission of Pennsylvania, Harrisburg, Pa., for the United States. This board was charged with the carrying out of the investigation in accordance with joint terms of reference agreed upon by the two Governments in October, 1925.

Following exhaustive investigations into all phases of the problem, the board on December 14, 1927, submitted to the two Governments an interim report setting forth the facts and conditions which afforded ample basis for the board's conclusions that, with adequate action, supervision and control by the two Governments, the scenic beauty of the falls

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GOLF IN OUR NATIONAL PARKS

Excellent Links Maintained in Jasper, Banff, and Waterton Lakes Parks—Amateur Championships at Jasper

The exceptional opportunities provided in many of Canada's national parks for the enjoyment of the Royal and Ancient game of golf are indicated by the fact that the Canadian Amateur Championships of the Royal Canadian Golf Association will be played over the course at Jasper in Jasper national park, Alberta, from August 19 to 24 this year. Golf courses are located in three

the leading links of England, Scotland, or the United States. The Jasper course encloses a great heart-shaped area, the first hole beginning and the eighteenth hole ending at the point. The links have been laid out to suit the play of all classes of golfers. There are three sets of tees, No. 1 for championship play; No. 2 for the less expert players; and No. 3 for ladies.



Golf in Our National Parks—View of the first tee on the golf course in Jasper national park, Alberta. The clubhouse stands to the left while through the trees may be seen peaks of the Pyramid range.

of the national parks in the West, namely; Jasper, Banff, and Waterton Lakes. The first two are eighteen-hole links, while that at Waterton Lakes park is a nine-hole course. All three combine features that appeal both to the golf enthusiast and the lover of scenery. The settings are superb while for sportiness these courses have few equals.

The links at Jasper and Banff are outstanding among those of this continent. Both have been constructed with a view to utilizing as far as possible natural hazards while preserving the views of the beautiful scenic surroundings.

The Jasper park links are operated by the Canadian National Railways in connection with Jasper Park Lodge, on beautiful lac Beauvert. A few minutes walk from the Lodge is located the course which to all lovers of the game forms one of the great attractions of Jasper. Designed by a well known golf expert, it embodies the most modern ideas in golf architecture, each hole being modelled upon some famous hole of

(Continued on page 3)

GREAT ACTIVITY THIS SUMMER IN ARCTIC REGIONS

MANY INVESTIGATIONS UNDER WAY

Department of the Interior Officials in Canadian North—Annual Patrol of SS. "Beothic"

The present summer will be one of great activity in the Arctic regions of Canada and numerous investigations and patrols will be carried out by officers of the North West Territories and Yukon Branch of the Department of the Interior. Plans for the annual visit of the ss. *Beothic* to the six posts in the Arctic archipelago have been practically completed and on July 15, officers of the Department will take over the ship at St. John's, Newfoundland. She will be sailed to North Sydney, Nova Scotia, where supplies and provisions will be loaded and the members of the expedition will go aboard preparatory to the departure for the North about July 20.

Mr. George P. Mackenzie, of the North West Territories and Yukon Branch, will again be the Officer in Charge of the annual patrol with Dr. H. A. Stuart as ship's doctor and Mr. R. S. Finnie as official historian and secretary to the Officer in Charge. Captain E. Falk will be ship's master and Mr. P. A. Taverner, ornithologist of the National Museum, Department of Mines, Canada, and Lieut. Commander Ricketts, of the International Ice Patrol, United States Coast Guard Service, will accompany the expedition. The usual detail of Royal Canadian Mounted Police to relieve other members of the force who have completed their tour of duty at the northern posts will also go North.

About a week after leaving North Sydney the *Beothic* will reach Godhavn, Greenland, and continuing north and west will cross the middle ice pack about July 29, reaching Pond Inlet on Baffin island, the first Canadian post to be visited, the following day. Calls will be made at the other posts—Dundas Harbour, Craig Harbour, Bache Peninsula, the farthest north detachment, Pangnirtung, and Lake Harbour—in the order named and the ship will then continue westward into Hudson bay to land supplies and materials at Chesterfield Inlet for the establishment of a medical officer at this point. The *Beothic* will then return to the home port of North Sydney early in September.

The extension of the Department of the Interior's medical service among the natives of Arctic Canada is another important work that will be carried out this summer. When the *Beothic* calls at

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CANADA'S EASTERN COAST FISHERIES

Includes Wide Range of Products—Sardine and Smelt Fisheries are Important

From sea mammals eighty feet in length, and comprising all species of whale; and from true fish varieties, such as the tuna of the mackerel family, fourteen feet in length and weighing fifteen hundred pounds; halibut, six hundred pounds; swordfish, eight hundred pounds; and sturgeon, five hundred pounds; to sardine herring and smelt—little fellows of the water—is the long range of fish life upon which the commercial fisheries of Canada thrive. Smelt and sardine herring are little fellows but a statement issued by the Dominion Fisheries Branch shows that they do not bulk small in the fisheries of the Atlantic coast. Indeed, the Miramichi River district in New Brunswick possesses the largest smelt fishery in the world.

The Atlantic sardines are the young of the herring which frequent the waters of the Grand Manan and Passamaquoddy Bay district of New Brunswick in immense numbers. The fish are especially abundant in the vicinity of Campobello island, Deer island, and smaller adjacent islands.

These sardines travel in great shoals and are captured in weirs of which there are more than five hundred built along the coast on the course usually followed by the fish. The entrance of the sardines into the weirs can be plainly seen, and the gates of the weirs are closed. Then the fish are drawn from the weirs by means of seine nets, whence they are loaded into boats by dip nets and conveyed immediately to the sardine cannery where they are quickly processed into the canned sardine product.

The catch for 1928 was 262,000 barrels. Of this catch ninety per cent was taken in the districts already referred to and the remainder in St. John County waters. The herring sardines have the highest food value of any canned fish product. They are put up in cottonseed oil, olive oil, tomato sauce, mustard and other sauces to suit the requirements of the trade. Cottonseed oil is used for the lower priced grades, and pure olive oil for the best grade. The cans contain about four ounces, the number of fish in each can ranging from six or eight to twenty-four according to grade.

The smelt is one of the most delicate, tasty, and highly prized pan fish inhabiting the sea. It is of the salmonoid family, and has a wide distribution in the North Atlantic waters, which include those of the New England States, but Canada produces about 75 per cent of the total catch. In the early winter smelt enter the rivers, where they are caught by means of gill-nets, bag-nets, box-nets, and hook and line. The box-net, a form of trap-net, is used in New Brunswick waters only, principally on the flats of the Miramichi river. Bag-nets are usually operated through holes cut in the ice. Gill-nets are chiefly used in open water before the ice forms.

The following table shows the catches and marketed values of smelts by provinces in 1928, subject to final revision:

	Catch	
	Pounds	Value
Nova Scotia.. . . .	608,900	\$ 103,000
Prince Edward Island.. .	1,312,200	112,319
New Brunswick.. . . .	5,986,600	912,055
Quebec.. . . .	1,197,600	101,820
Totals.. . . .	9,105,300	\$1,229,194

The catch for the Miramichi River district is particularly noteworthy, as it

constitutes more than 50 per cent of the total. This district, which, as has been pointed out, has the largest and most important smelt fishery in the world, markets about 4,000,000 pounds annually.

The catch in New Brunswick is largely sold in a fresh frozen condition to dealers in the United States, or held in local cold storage establishments for favourable markets. In Nova Scotia and Prince Edward Island a considerable portion of the catch, usually iced in barrels, is shipped fresh, and commands the highest market prices.

GREAT ACTIVITY THIS SUMMER IN ARCTIC REGIONS

(Continued from page 1)

Pangnirtung late in August, Dr. L. D. Livingstone, who has spent the past year among the natives of Baffin island, will be taken aboard and will accompany the ship to Chesterfield Inlet to supervise the landing of supplies and materials for the new medical post which he will occupy there. Dr. H. A. Stuart, of the Royal Victoria Hospital, Montreal, who will be ship's doctor on the northern leg of the *Beothic's* patrol, has been appointed to succeed Dr. Livingstone on Baffin island with headquarters at Pangnirtung. Dr. R. D. Martin, of Barrie, Ontario, will occupy the proposed new medical post on the Arctic coast at the mouth of the Coppermine river. Supplies and materials for the establishment of this post will go north the first week in July on board the Hudson's Bay Company steamer *Bay-chimo*, from Vancouver, and Dr. Martin will arrive at the Coppermine to take charge about the same time as the boat. He will go down the Mackenzie river and then eastward along the coast by steamer or power boat.

Investigations in connection with the improvement of conditions among the natives and of wild life matters will also be advanced during the present season. Early in June Mr. A. E. Porsild, of the North West Territories and Yukon Branch, started for James bay where he will make a survey of Charlton and Akimiski islands and the nearby coast in the interest of wild life propagation. On his return he will start for Alaska where he will select from the reindeer herds 3,000 of the largest, healthiest, and most virile animals for the Department of the Interior. About October of this year the herding of these reindeer along the northern coast of Alaska to the 15,000 square miles of grazing grounds selected for them to the east of the delta of the Mackenzie in the Northwest Territories of Canada will begin. It is expected that the big herd will reach the region between Point Barrow and the Colville river, which is excellent grazing ground, in the spring of 1930. The herd will remain in this

area while fawning takes place and until the young deer are big enough to travel which will be about the following September or October. The movement eastward will then be resumed and the delivery of the animals to departmental officers in the area to the east of the Mackenzie river will be made in the spring of 1931. Mr. A. E. Porsild, after completing his work in Alaska, will return to Ottawa. Mr. R. T. Porsild, who is at present in Greenland visiting his parents, will return to Canada early in 1930 and will immediately go to Aklavik to begin preparations for the reception of the reindeer herd. Corrals, houses, and other equipment must be erected before the big herd reaches its new home.

Other officers of the Department of the Interior who are engaged in research work in northern Canada are Mr. W. H. B. Hoare and Major L. T. Burwash. Mr. Hoare accompanied by Warden A. J. Knox, of Fort Smith, is completing his survey and patrol of the Thelon Game Sanctuary at the east end of Great Slave lake. The only report received from Mr. Hoare since he began his work in the 15,000 square mile musk-ox preserve in 1928, reached Ottawa early this year and no further word is expected until next autumn when he will come out either by way of Baker lake and Chesterfield on Hudson bay or by Fort Smith and Edmonton. Major Burwash, who carried out a number of investigations in the vicinity of Boothia peninsula during the past winter, is at present enroute to the Coppermine River area. On his arrival he will begin an investigation into the mineral and other resources of Coppermine River reserve and upon its completion he will return to Ottawa by way of Great Bear lake, Norman, Fort Smith, and Edmonton.

Preserving Historic Sites

The movement for the preservation of national historic sites in Canada dates back to the year 1919. Representations were made then to the Dominion Government urging the necessity of a national organization for the preservation of historic sites and as a result an honorary Historic Sites and Monuments Board was created. This board is composed of a number of eminent Canadian historians who have given their services without compensation.

Hot Springs in Kootenay Park

The natural temperature of the main spring of the Sinclair Radium Hot Springs in Kootenay national park, British Columbia, is about 114 degrees Fahrenheit. The radioactivity in these springs is unusually high and it is believed that their therapeutic efficacy may be partly due to this fact.

MARKING HISTORIC SITES IN CANADA

Work of Department of the Interior Perpetuates Memory of Salient Events in Our History

The work of the Department of the Interior in perpetuating the memory of the salient episodes in the history of the Dominion is once more recalled by the recent meeting of the Historic Sites and Monuments Board of Canada. Scattered throughout the Dominion are physical evidences of some of the most romantic and interesting incidents in the annals of the North American continent. In order that those historical features should not be lost to posterity, the Minister of the Interior a few years ago appointed the Board to advise the Department on all matters relating to this subject. Having duly considered the Board's recommendations the Department of the Interior thereupon decides what is to be done, and through its National Parks Service marks the sites with artistically designed tablets set on cairns, cut stone monuments or nearby permanent structures and in the case where ancient objects, buildings, or ruins exist, carries out an effective scheme of preservation. In this way across her wide expanse, from the Atlantic to the Pacific and from the Great Lakes to the Arctic seas, Canada nurtures for posterity the glory of her past. Since the inception of this work in 1919 the Department of the Interior, on the recommendation of the Board has marked one hundred and twenty-nine sites by the erection of suitable memorials. Others are being acquired from time to time and it is hoped to mark eventually all those throughout Canada which are of a distinctive national character.

During last year a number of sites of national importance were marked and among the monuments unveiled amid appropriate ceremony was one commemorating the landing of Jacques Cartier in Canada at the Ile-aux-Coudres on September 6, 1535. In the presence of a distinguished company the unveiling ceremonies took place last September, the inscription on the monument setting forth that "On 6th September, 1535, Jacques Cartier anchored his three ships near this place, explored the island, and named it Ile-aux-Coudres." Cartier's historic landing was also the occasion of the first recorded Christian service on what is now Canadian soil.

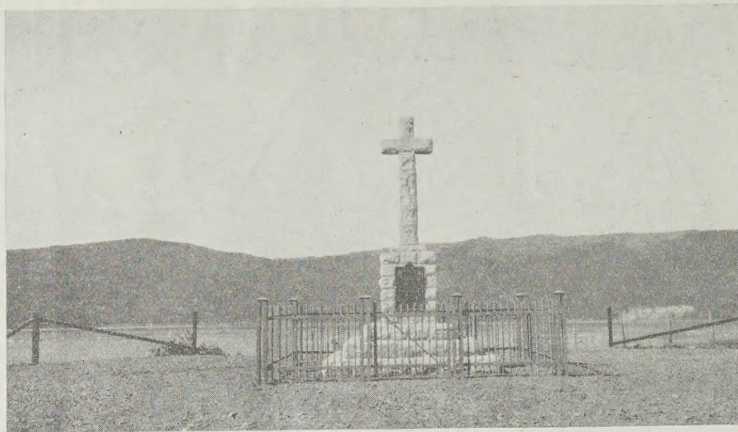
At the recent meeting of the Board, 125 sites were reviewed, and several recommendations were forwarded to the Department of the Interior. Brigadier General E. A. Cruikshank of Ottawa presided at the meeting and the other members in attendance were: Dr. J. C. Webster, Shediac, N.B., Judge W. Crowe, Sydney, N.S., Honourable P. Demers, Montreal, P.Q., Dr. J. H. Coyne, St. Thomas, Ont., His Honour Judge F. W. Howay, New Westminster, B.C., Mr. J. B. Harkin, Commissioner, National Parks, Ottawa, and Major A. A. Pinard, Secretary.

Of the new sites or events selected for commemoration, the following are the most outstanding:

Wolfe's Landing, Gabarus Bay, Cape Breton—Site of the landing place of Brigadier General James Wolfe's brigade on the 8th June, 1758.

First Coal Mine in Cape Breton—Site of the first regular coal mining operations in America, begun by the French in 1720.

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Marking Historic Sites in Canada—View of the memorial erected at Ile aux Coudres, off the north shore of the St. Lawrence river about fifty miles below Quebec. This memorial marks the first landing place of the famous French explorer, Jacques Cartier.

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MinisterW. W. CORY, C.M.G.,
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OTTAWA, JULY, 1929

THE BIRD SANCTUARIES OF THE ST. LAWRENCE

Sea-birds Provide Thrilling Spectacle for Visitors—Are Increasing Under Protection

Thousands of sea-birds—gannets, eider ducks, puffins, cormorants, terns, and many others—wheeling and screaming or covering the nesting ledges like banks of snow, is the scene which presents itself to the visitor to the bird sanctuaries of the gulf of St. Lawrence. Since the earliest times the Bird Rocks of the Magdalen islands, Percé Rock, and Bonaventure island off the Gaspé coast and the islands along the north shore of the gulf have been the breeding grounds for countless numbers of sea-birds, and the protection their bird inhabitants have received because of the Migratory Birds Convention Act, has resulted in greatly increasing their numbers. Each year the sanctuaries are visited by a migratory bird officer from the Department of the Interior and careful note is made of the increase among the birds under protection.

The fame of the bird sanctuaries of the St. Lawrence, which number thirteen, has spread and growing throngs of tourists make the trip by rail or steamer each year. The Gaspé Coast rookeries were set aside in 1919 and those along the northern shore of the gulf were established in 1925. All are under the joint control of the Dominion Government and the Quebec Provincial authorities.

The bird sanctuaries off the Gaspé coast, which are reached with ease by rail to the quaint little town of Percé, are better known than those of the north shore and consequently the thrilling picture of the great throngs of gannets which inhabit the Bird Rocks, Percé Rock, and Bonaventure island are known to many. Nevertheless even those who have rowed about these islands daily for years can never behold the scene without a thrill of emotion. In addition to the attraction of the sanctuaries, the Gaspé coast offers beautiful shore and forest scenery, bathing, fishing, and boating, and in the holiday season the accommodation of the modern

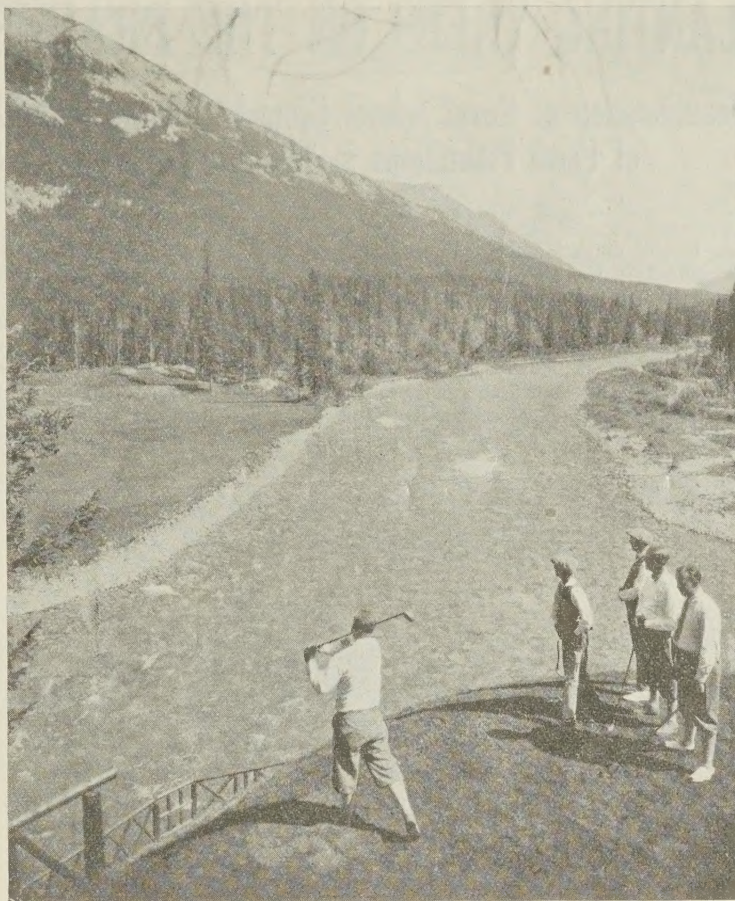
summer hotels and boarding houses of the locality is taxed with the hundreds of visitors.

Although the nearest of the north shore sanctuaries is situated about 400 miles east of the city of Quebec, they can be reached with comparative ease, as well appointed steamers with frequent sailings, serve that region during the summer months. The chief bird inhabitants of the north shore preserves are puffins, razor-billed auks, eider ducks, gulls and terns. The inspiring spectacle at the sanctuaries is not the only enjoyment to be gained from a trip to the gulf of St. Lawrence. The steamer voyage to the north shore sanctuaries is in itself a delight. Sailings are made from Quebec and the stops at the little settlements are highlights of the trip. Here, is a thriving new town, with a modern pier and electric light system, the centre of extensive pulpwood operations of the most up-to-date kind. There, is a sleepy little fishing hamlet, where passengers, mail, and freight are transferred between ship and shore by a small rowboat. Next a stop is made at a fur trading post with its picturesque Indians, and then at a thriving village of 1,100 souls, the largest community in the 400,000 square miles of the Labrador peninsula, and a bishop's seat.

The scenery along the route is enchanting. Delightful little islands in intricate arrangement; ancient hills of red granite, not wholly hidden by the soft greens and grays of the vegetation; spouting whales; whirling clouds of sea-birds; and sunsets of unusual glory; each adding in turn to the attractiveness and charm of the surroundings.

Variations of Steel Tape

A 300-foot flat band steel tape will vary in length in the range of temperatures met with in Canada by several inches according to investigations of the Physical Testing Laboratory of the Topographical Survey, Department of the Interior.



Golf in Our National Parks—"Teeing Off" on the remodelled golf course at Banff in Banff national park, Alberta. The No. 1 tee is on a ledge overlooking the Spray river and the first drive is across the Spray which is about 100 feet wide at this point. A small foot-bridge leads to the left for the convenience of the players.

GOLF IN OUR NATIONAL PARKS

(Continued from page 1)

way. Last year they were completely remodelled and are now considered one of the sportiest courses on the continent. In the beauty of the scenic setting the Banff links are unsurpassed. The great facade of mount Rundle rises directly to the east, Tunnel mountain lies to the north across the Bow, Sulphur mountain stands to the west, and to the east is the Fairholme range.

The first tee of the course is located on a shelf cut high up on the south bank of the Spray river at the foot of Sulphur mountain, and the first drive is across the Spray which is about 100 feet wide at this point. There are two other beautifully situated water hazards, the next being at the 8th hole, where the drive is across a small, shallow lake, set in a cup-like amphitheatre, and called the Devil's Cauldron. The water hazard at the 13th hole is across an elbow of the Bow.

About a mile to the east of the town-site in Waterton Lakes national park on the high rolling slopes at the base of mount Crandell is the nine-hole golf course operated by the Dominion Government. It affords extremely interesting possibilities in the way of play and its setting is typical of that part of the Rockies. The layout of this course is excellent and it has many of the sporting features which go to make play attractive. From practically every hole there are magnificent views in nearly all directions; and from the ninth there is a panorama as lovely as can be seen from any other links in the world. From the small clubhouse which provides a centre for sociability one looks down, too, upon exceptionally fine views.

The fame of the golf courses in the national parks has spread rapidly and each season thousands visit Jasper, Banff, and Waterton Lakes parks to enjoy the game over these links. Very

CANADA APPROVES OF NIAGARA FALLS IMPROVEMENT PLAN

(Continued from page 1)

could be preserved for the enjoyment of future generations, and that by suitable remedial works water could be distributed to cover the bared flanks of the Canadian falls and the present tendency to erosion in the bend modified, thereby enhancing the present beauty of the spectacle as a whole.

The board estimated that the cost of the works would be \$1,750,000 and recommended that early action be taken to secure the scenic results and reduction of erosion as soon as possible and pointed out that construction would afford opportunity to both Governments to actually test in practice the effect of temporary additional withdrawals of water and the efficiency of remedial works to offset such withdrawals.

The board in all its investigations co-operated closely with the authorities of the province of Ontario, the Niagara Falls Park Commission, the Hydro-Electric Power Commission, and with the New York State Reservation Commission and the Niagara Falls Power Company of New York.

The fundamental principle of the Convention is the construction of remedial works designed to preserve the falls and to enhance their present scenic beauty. As a secondary measure it is provided that, concurrently with the construction and tests of the remedial works it shall be experimentally determined whether or not additional amounts of water may be permitted to be diverted from the Niagara river. To determine this the Convention permits the diversion of an additional 10,000 cubic feet of water per second on each side of the river during the non-tourist season—October 1 to March 31—for a period of seven years only. The remedial works will be built under conditions which will permit of their value being tested from time to time while under construction. By this means the resulting effect of the works upon the scenic values can be checked and adjustments in the works made, if necessary.

This successful culmination of negotiations initiated between the two Governments in 1925 was made possible by the close co-operation between the Dominion Government, the Government of Ontario and the Hydro-Electric Commission. It promises a most satisfactory solution of the problem of preserving and enhancing the splendour of Niagara, one of the Wonders of the World.

great is the lure of "golf among the clouds," and oftentimes what was intended to be a brief holiday is extended throughout the season so great is the attraction.

Distance of the Sun

A new method of determining the distance of the sun suggested at the Dominion Observatory, Ottawa, depends on three accurately known measurements: the velocity of light, the wavelengths of spectrum lines, and the shape of the Earth's orbit. Daily observations of the spectrum of the sun's centre with a constant comparison spectrum have been made for years and preliminary measurements indicate promising results.

Miette Hot Springs

The waters of Miette Hot Springs in Jasper national park, Alberta, resemble those of the Sulphur springs at Banff but are several degrees hotter. These springs are situated about 12 miles from the railway and are reached by a good trail.

CANOEING IS POPULAR IN EASTERN CANADA

Vast System of Inland Waterways Offers
Unlimited Opportunities for Travel
by Canoe

Down through the years of discovery, exploration, and fur-trading the canoe and paddle have been linked with Canadian history. As a means of exploration it was particularly suited to long journeys on the vast network of connected waterways which extend from the coasts to the interior. Without the aid of the canoe, knowledge of the extent and possibilities of the country would have been long delayed. In more recent years the canoe has become more or less of a pleasure craft, although it still is the regular means of transportation in some wilderness sections of the Dominion and is assisting materially in the exploitation of newly discovered mineral areas.

As a pleasure craft the canoe ensures the vacationist an independence and freedom possible in few other ways. The growing popularity of cruising by canoe is indicated by the increasing number of inquiries reaching the Department of the Interior, Ottawa, requesting information on Canada's inland waterways. These inquiries presage a season of pleasure, which may be spent on short trips from a main camp, or on the voyages of the adventurous through the byways of the wilderness.

In general a map of eastern Canada shows only a small portion of the waterways suitable for canoeing. The lakes and streams are so numerous that even the largest scale maps generally issued do not show them all. The routes open to canoeists are numberless, and each in its own fashion has charms to fascinate the traveller. The province of Nova Scotia has special attractions in the lake areas of Queens, Annapolis and Lunenburg counties. There, lake Rossignol, lake Kejimikujik, and the Medway river recall their devotees and add new ones every summer. Farther west towards Yarmouth are the Sissiboo, Tusket, Jordan, and Roseway rivers. From Halifax the Dartmouth and Panhook lakes are easily reached, and on the Shubenacadie river one may journey down to Maitland or Truro. In Cape Breton are the Bras d'Or waters, that golden arm of the sea surrounded by scenes of pastoral beauty and mountain grandeur. There also the beautiful Mira river offers a short but interesting cruise.

The rivers and lakes of New Brunswick offer a variety of trips. Rugged and picturesque country is traversed in the cruise from Plaster Rock to Bathurst by the Tobique and Nepisiguit rivers, or by turning north at Portage brook the Upsalquitch river may be followed down to Matapedia. The Miramichi river, which crosses the province from west to east, is another famous cruise. The Saint John river is a most interesting trip, the scenery is varied and one is seldom far from sources of supply to replenish depleted larders. The canoeist who abhors portaging will find only one short carry in the course of the two hundred miles between Grand Falls and Saint John.

In Quebec there are many cruises where all supplies must be taken in at the start of the trip. The route from lake St. John to lake Mistassini is one that falls in this category, and is a wilderness trip in every sense. Along the line of the Canadian National railway in northern Quebec almost every station is a potential starting point for

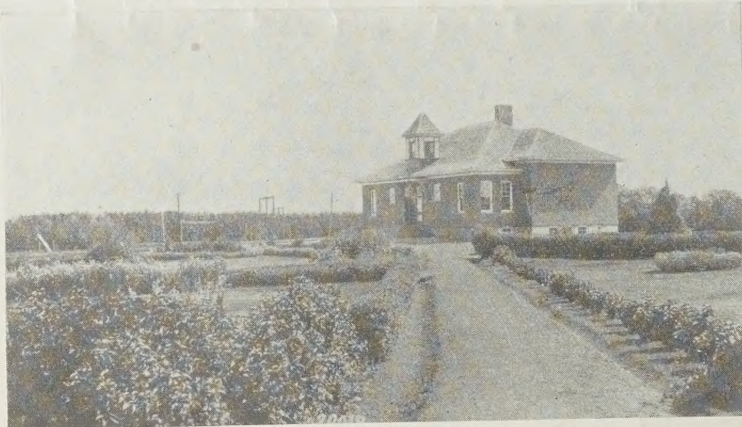
PLANTING TREES ON THE PRAIRIES

Beautification of Rural School Grounds Follows Success
of Farm Plantations in Western Canada

At the beginning of this century when in the face of much indifference and no little opposition the Department of the Interior through its Forest Service began the distribution of free trees to farmers in Western Canada, the chief objects were to make the prairie farmsteads more homelike and comfortable and the farms themselves more productive. In the nearly thirty years that have elapsed

appearance of large sections of the prairies through the planting of these trees.

The Department distributes forest trees exclusively and, as has been frequently noted in recent years, the effect has been to encourage the development of orcharding and the growing of small fruits and tender vegetables which formerly, it was thought, would not grow in the Middle West. Another very



Planting Trees on the Prairies—The grounds of Creelman school, Creelman, Saskatchewan, showing how they have been attractively improved by tree and shrub plantations. Trees supplied by the Forest Nursery Station of the Department of the Interior were planted in 1916 and had attained a height of eighteen feet when this photograph was taken last year.

since then, because of a realization of the widespread benefits of prairie tree planting, apathy and opposition have given place to enthusiasm and support of this policy. The annual distribution has grown from a meagre 50,000 trees in the first years to approximately 8,000,000 seedlings and cuttings at the present time. Reports show that a large percentage of the new shelter-belts set out are successful and travellers are constantly noting the change in the

a wilderness trip. Scores of trips are available in the more settled portions of the province and those that have taken the run from Maniwaki to Ottawa through the Thirty One Mile lake region will long remember it.

The canoeing areas in Ontario are legion, and the famous Rideau Lakes, Kawartha Lakes, Muskoka, Georgian Bay, Algonquin Park, and French River trips, and others scarcely need mention. Northern Ontario is fast becoming a favourite cruising area, and the exploring canoe is opening up new routes. The country north of the Ontario-Minnesota border—the Quetico region, lake of the Woods, Rainy lake and north to Sioux Lookout welcomes returning canoeists year after year. The Albany river, the Missinaibi, Mattagami, and Abitibi rivers and others leading to Hudson Bay, once the highways of the fur-traders and explorers, are now being travelled by pleasure seekers.

Maps such as the sheets of the Standard Geographical map issued by the Department of the Interior, Ottawa, cover certain areas in detail and are of great assistance to the canoeist. In addition to these maps the Natural Resources Intelligence Service of that Department, has prepared progressive descriptive details of numerous routes accompanied by charts showing portages and other information. A list of these trips may be had upon application.

pleasing change which has followed the general adoption of the plan of tree planting on farms has been the improvement in the grounds and surroundings of rural schools on the prairies. Naturally the improvement of school grounds is a much more difficult matter than that of planting groves around farm homes. The chief difficulty, of course, is the constant changing of teachers and of rural school trustees. Added to this is the fact that school vacation occurs at the very time when, in the first three years after planting, the trees require attention in order to ensure their subsequent growth.

In spite of these handicaps a great deal has been accomplished. In the province of Saskatchewan there are approximately 4,800 rural schools and of these 1,098 have applied for and received trees from the Forest Nursery Stations at Indian Head and Sutherland. While the proportion of plantations which have become permanently established on school grounds is not so high as in the case of those on farms, the results on the whole are decidedly encouraging.

The average prairie school with its bare surroundings is anything but inspiring and it is not difficult to realize the effect such conditions must have on the impressionable minds of the young children who necessarily spend so much of their time there. If every rural school could be surrounded by an attractive setting of trees, shrubs, and flowers the ultimate value to the community and the country as a whole would be inestimable.

That the handicaps under which the average school labours in respect to the improvement of the surroundings can be overcome is evident from the record of those that have been successful. In some cases the success has been outstanding and in such it is generally evident that the community as a whole has taken special pride and interest in

OIL PRODUCTION IN ALBERTA FOR MONTH OF APRIL, 1929

More Than Double That of Corresponding Period
Last Year

The output of oil from the wells in Alberta during the month of April, 1929, was more than double that of the corresponding period last year according to figures compiled in the Department of the Interior from reports of the operators. The comparative figures follow:

	Naphtha 60° or higher (brls)	Light Crude 30°-60° (brls)	Heavy Crude 30° or lower (brls)	Total (brls)
April, 1929. . .	68,262	5,611	971	74,844
April, 1928. . .	29,949	4,825	972	35,746

MARKING HISTORIC SITES IN CANADA

(Continued from page 2)

Fort Ste. Anne, Cape Breton—Site of an early settlement and Jesuit Mission established by the French in 1629.

Fort St. Peters, N.S.—Site of a fortified post and trading station built by the French in 1650.

Minto Coal Mine, N.B.—To commemorate the discovery of coal by the French near the present town of Minto soon after their occupation of Acadia.

Chambly Road, P.Q.—The first road built in New France was constructed near here by de Courcelles, 1665.

King Mountain, P.Q.—The site of the first triangulation station of the Geodetic Survey of Canada, established in 1905 about 9 miles north of the city of Ottawa.

Quebec Seminary, Quebec, P.Q.—The oldest educational house in Canada, established by Laval in 1663.

The Normandale Furnace, Normandale, Ont.—Founded in 1818 and operated until 1853.

Kingston, Ont.—Commemorating the treaty signed with the Mississauga Indians 1793 whereby a large tract of land in Eastern Ontario was purchased for the settlement of United Empire Loyalists.

Fort Erie, Ont.—Commemorating the enterprise, and courage of the men of the Royal Navy and Royal Marines in capturing the United States ships of war, *Ohio* and *Somers* in the Niagara river, August 12, 1814.

Bay of Quinte Carrying Place—Commemorating the treaty concluded with the chiefs of the Mississauga Indians in 1787, by which a large tract of land in western Ontario was ceded to the Crown.

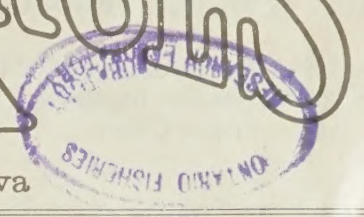
Quesnel, B.C.—To commemorate the beginning in 1865 of work on the Collins Overland Telegraph line intended to link America and Europe by way of British Columbia, Alaska, Behring Straits and Siberia.

Fort Prince of Wales, Churchill, Man.—The most northerly fortress on the American continent built by the Hudson's Bay Company in the years from 1733 to 1747 to safeguard the harbour

the school, that there is close co-operation between the trustees, the teacher, and the neighbouring farmers, and that all are interested in seeing that the trees receive the necessary attention. In such localities the school grounds become a community centre and are used for picnics and other gatherings thus proving a valuable asset in the general development of the district.

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CANADA'S ARCTIC EXPEDITION ON ANNUAL PATROL

SAILS ON BOARD STEAMER "BEOTHIC"

To Visit Posts on Eastern Islands and Establish Medical Station in Hudson Bay

The annual expedition of the Department of the Interior to the posts in the Eastern Arctic sailed on board the ss. *Beothic* from North Sydney, Nova Scotia, on July 20 on its 8,000-mile patrol through the ice-filled waters of the Canadian archipelago. Preparations for the 1929 expedition have been under way for several weeks under officers of the North West Territories and Yukon Branch and on July 17 the *Beothic* crossed from St. John's, Newfoundland to North Sydney, where coal and supplies were loaded and the members of the expedition went aboard. After visiting the six posts in the North, namely, Pond Inlet, northern Baffin island; Dundas Harbour, Devon island; Craig Harbour and Bache Peninsula, Ellesmere island; Pangnirtung and Lake Harbour, southern Baffin island; the *Beothic* will sail into Hudson bay, stopping at Chesterfield while material and supplies are unloaded for the establishment of a medical health officer at that point. The expedition is expected to return to North Sydney early in September.

For the fifth consecutive voyage, Mr. George P. Mackenzie, of the North West Territories and Yukon Branch, is the Officer in Charge of the expedition. Capt. E. Falk is ship's master and Capt. L. D. Morin, ice pilot. Mr. R. S. Finnie is secretary and official historian of the expedition. Dr. H. A. Stuart will be ship's doctor during the greater part of the trip but will disembark at Pangnirtung to continue the work among the Eskimos of Baffin island begun by Dr. L. D. Livingstone. After having spent the past year on Baffin island Dr. Livingstone returns to Ottawa. Later he will take charge of the medical post at Chesterfield. Mr. P. A. Taverner, of the National Museum, Department of Mines, is the naturalist with the expedition. Arrangements had been made by the Department of the Interior to permit Lt. Commander N. G. Ricketts, of the United States Coast Guard Service to accompany the expedition on behalf of the International Ice Patrol but shortly before sailing word was received that it would not be possible for Lt. Commander Ricketts to make the trip this year. Mr. J. D. Soper, who has been carrying on scientific investigations in southern Baffin island, will return south

(Continued on page 4)

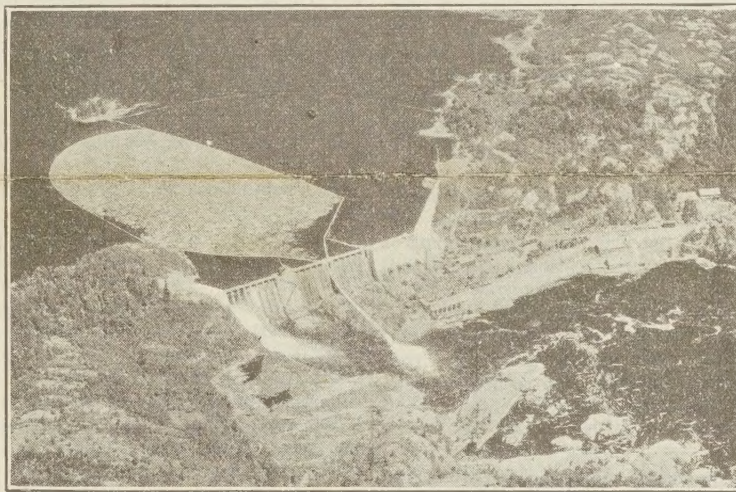
MID-YEAR WATER-POWER REVIEW

Hon. Charles Stewart, Minister of the Interior, Indicates Progress of Development in Canada

In the following mid-year review of water-power activities in Canada, Honourable Charles Stewart, Minister of the Interior, indicates the progress of hydro-electric development since he issued his annual statement at the beginning of the year. A number of developments have been completed and placed in operation, good progress has been made in construction on a number of undertakings of major importance,

2,250 h.p. automatically operated plant at the existing diversion dam.

Elsewhere in the province, the West Kootenay Power and Light Company has completed its 75,000 h.p. undertaking at South Slocan on the Kootenay river, and at Shuswap falls in the Vernon district the West-Canadian Hydro-Electric Corporation brought into operation a development with an initial installation of 3,800 h.p.



Mid-Year Water-Power Review—Aerial view of the International Nickel Company's development at Big Eddy dam on the Spanish river, Ontario. This plant was brought into operation this year and has an installed capacity of 23,200 horse-power.

and new projects of magnitude are in prospect in many provinces.

In the first half of the year new developments together with additions to existing plants have added almost 200,000 horse-power to the total installation in the Dominion while undertakings are under way which, when completed to their designed capacities, will involve a total installation in excess of 2,000,000 horse-power. In the following paragraphs brief reference is made to the more important undertakings in the various provinces:

British Columbia.—Construction was started early in the year on a new development for the British Columbia Power Corporation at Ruskin on the Stave river. It is expected to have the first unit of 42,500 h.p. in operation by the autumn of 1930 and a second unit of similar size in 1931. The same Corporation is actively proceeding with the construction of a large development on Bridge river with the expectation of completing the initial installation of 56,000 h.p. in 1933. The enlargement and improvement of the Jordan River development on Vancouver island has also been proceeded with, which includes a

Projected developments include one of 15,000 h.p. for the East Kootenay Power Company at Phillips Canyon on the Elk river, one of 80,000 h.p. for the West Kootenay Power and Light Company on the Pend d'Oreille river while others are mooted on the Campbell, Nimpkish, and Stamp rivers on Vancouver island, and on Lois, Chilco, and Adams rivers on the mainland.

Alberta.—Good progress is being made by the Calgary Power Company with the construction of a development at the Ghost site on the Bow river about thirty miles west of Calgary. The initial installation will consist of two 18,000 h.p. units and it is hoped to have the plant in operation under partial head by November of the present year. The Company is also extending its transmission system in the district between Calgary and Edmonton.

Saskatchewan.—The first hydro-electric development in Saskatchewan is now well under way at Island Falls on the Churchill river where the Churchill River Power Company, a subsidiary of the Hudson Bay Mining and Smelting Company, is constructing a power station de-

(Continued on page 5)

EDUCATING OUR INDIANS IS AN IMPORTANT TASK*

NEW SCHOOL IN THE MARITIMES

Dept. of Indian Affairs Conducts Day and Residential Schools Throughout Canada

One of the very important functions of the Department of Indian Affairs is the providing of educational facilities for Indian children throughout the Dominion. Day schools are conducted on reserves in every province and where conditions necessitate it, residential schools are also operated. In order to provide academic instruction and vocational training for those Indian children in the Maritime Provinces whose needs are not met by the twenty-two day schools conducted in that part of Canada by the Department, a residential school has been erected at Shubenacadie, Nova Scotia. There are six such institutions in the vicinity of the Great Lakes in Ontario and many in Western Canada but the one lately erected at Shubenacadie is the only one in the Maritimes. The new school, which will house 125 pupils and the necessary teaching staff and provide accommodation for classroom and domestic instruction, will be opened about the middle of September. In due time there will be erected barns, workshops, and the other equipment necessary for the vocational courses.

Of the day schools conducted by the Department of Indian Affairs in the Maritime Provinces, eleven are located on reserves in Nova Scotia, ten in New Brunswick, and one on Prince Edward Island. These schools solve the ordinary problem of educating the children residing in close proximity to the schools. There remains the necessity of providing for orphans, neglected children, and those who live too far from the day schools to be regular attendants. It is for these under-privileged children that the residential school has been established.

From the establishment of the first industrial school nearly one hundred years ago, there has been co-operation between the Dominion Government and the various religious denominations interested in missionary work among the Indians. In following this well established policy the Shubenacadie school will be conducted under the auspices of the Roman Catholic Church, as the

* Prepared at the direction of Dr. Duncan G. Scott, Deputy Superintendent General of Indian Affairs, by Mr. Russell T. Ferrier, Superintendent of Indian Education.

(Continued on page 2)

UNBREAKABLE BOXES FOR OUR PRODUCTS

Forest Products Laboratories, Dept. of the Interior, Develop Damage-Proof Produce Carriers

A practical and popular object lesson on the value of scientific research on the part of the Department of the Interior, is to be found in the increased safety with which Canada's merchandise is shipped throughout the country and to points abroad. Damage to freight in transit is a source of loss to shippers which for many years they have endeavoured to reduce, and manufacturers are constantly directing their efforts towards the production of a damage-proof carrier. The problem has been submitted to the Forest Products Laboratories of the Forest Service and the research work carried on by that body has resulted in the development of a number of containers for different products which have withstood in tests all forms of violence to which freight in transit is generally subjected.

The Forest Products Laboratories of the Department of the Interior at Ottawa and the branch at Vancouver are equipped with modern testing machines operated by experts, so that when the question arose of securing the best types of produce container, the tests were thorough and practical. In the Timber Testing Division of the Laboratories at Ottawa there is a huge machine known as the Hazard. The duty of the Hazard is to test boxes and other types of containers. It consists in the main of a large cylinder, seventeen feet in diameter, mounted on car wheels and driven by an electric motor. On the inner surface of the cylinder are diagonally sloping shelves which divert the course of the boxes placed therein. The cylinder is revolved at varying speeds and in this way the containers are given thorough tests—tumbling, bumping and sliding in every direction.

At the request of the Dominion Department of Agriculture types of butter and cheese boxes in most common use, known by the names of the Manitoba "nailed corner," the Ontario "dovetail," and the "lock corner" of Alberta and Quebec, were tested at the Laboratories. First the resistive powers of the different woods used in the construction of these containers were tested on the impact, compression, and tension machines and then the boxes were tried in the Hazard.

From these and other experiments the strongest and most economical woods and the most durable types of construction are determined and a standard receptacle evolved for each class of freight. It is now specifically known what are the best kinds of wood for boxes, crates, and other carriers; how these woods should be re-enforced, and exactly in what manner they should be constructed to prevent damage to the contents.

The above is only one of the many investigations undertaken constantly in the interests of Canadian trade and commerce. Canadian manufacturers are bringing, in increasing numbers, their problems to the Laboratories and the Dominion's business is benefitting by the results of the researches carried out.

Nova Scotia gold ores are essentially free milling but in some cases gold is associated with arsenical pyrites.



Educating Canada's Indian Children—A recent photograph of the new Indian residential school at Shubenacadie, Nova Scotia, erected by the Department of Indian Affairs. It provides accommodation for 125 pupils and the teaching staff. It will be opened during the month of September.

Educating Our Indians is an Important Task

(Continued from page 1)

Indian bands in the Maritimes are all adherents of that faith.

Rev. Father J. P. Mackey has been appointed principal and is now installed in the school. Under the Department's direction he will have general charge of the institution. The Sisters of Charity, who will conduct the domestic and classroom activities, will move into their quarters about the middle of August. The teachers and other instructors will be fully qualified, and the educational activities will be academic and vocational. The classroom work will be comparable to that in the public schools of the province. At the Department's request the school will be inspected by officers of the Provincial Department of Education. The vocational training will include: for the girls, domestic science; and for the boys, farming, gardening, care of stock, and possibly manual training, thus placing graduates from this school in a position to become self-supporting and independent.

ALBERTA'S OIL PRODUCTION CONTINUES TO INCREASE

May, 1929, Output More Than Double That of Same Period Last Year

Alberta's oil production again recorded a gain in the month of May, 1929, as compared with the same period last year according to figures compiled in the Department of the Interior from the reports of operators. The 1929 total was more than double that for May, 1928. The comparative figures follow:

	Naphtha 60° or higher	Light Crude 30°—60°	Heavy Crude 30° or lower	Total
	(brls.)	(brls.)	(brls.)	(brls.)
May, 1929	82,240	6,926	1,019	90,185
May, 1928	37,657	5,819	832	44,308

Point Pelee National Park

Point Pelee national park at the southernmost point in the province of Ontario, has many attractions among which are unique flora and fauna. It contains a number of plants, birds, and trees which are not found elsewhere in Canada, and as it is a bird sanctuary, it forms a safe resting place for thousands of waterfowl and song-birds during the great spring and fall migrations.

POLICE ACTIVITIES IN CANADA'S FAR NORTH

Changes of Personnel at Royal Canadian Mounted Police Posts in Arctic Regions

Growing activity in exploration and development in the Northwest Territories of Canada has greatly increased the work of administering the affairs and safeguarding the interests of the scattered native and white population of these vast regions. The administration of the regions north of the 60th parallel is in the hands of the North West Territories and Yukon Branch of the Department of the Interior. The interests of the National Revenue, Indian Affairs, Labour, Post Office, Marine and Fisheries, Justice, and other departments of the Federal Government are attended to in large measure by the Royal Canadian Mounted Police who also maintain law and order.

During the present season twenty-three members of the R.C.M.P. will proceed North to relieve officers of the force who have completed their tour of duty and to man the two new detachments to be established, one on the Liard river just north of the boundary between the Northwest Territories and British Columbia and the other at Baker Lake, Chesterfield inlet on the west coast of Hudson bay. Constables W. B. MacGregor, A. M. McKellar, R. J. Kidston, J. C. M. Wishart, and W. P. Fraser will relieve officers coming out from the posts on the islands in the Eastern Arctic. They are travelling North on board the ss. *Beothic* which sailed from North Sydney on July 20. Constables J. W. McCormick, W. J. D. Stewart, and H. O. Humphrey will proceed by steamer to Hudson bay during the present season, while those going down the Mackenzie river include Inspector A. N. Eames, Corporal A. T. Belcher, and Constables T. H. Tredgold, S. Dykes, G. Black, W. H. Mason, L. Weston, E. F. Lewis, F. D. Riley, J. E. McCordle, R. Newton, E. J. M. Lawrence, H. H. Purkis, D. C. Martin, and L. Nicholson. The assignment of the non-commissioned officers and men to the different posts is left to the officer in charge of the district.

The Royal Canadian Mounted Police auxiliary schooner, *St. Roch*, which spent the past year in service along the Western Arctic coast, acting as a supply ship and floating detachment, will make the trip south by way of Bering strait, reaching Vancouver late in September. Supplies will be distributed by the *St. Roch* to the posts at Baillie, Bernard Harbour, and if ice conditions permit, at Cambridge Bay, before she is headed south. The schooner will spend the winter in Vancouver undergoing certain adjustments which will fit her for a stay in the Arctic of from eight to ten years.

for the making of relief maps. Vertical aerial photographs may now be combined into pictorial representations of the country known as mosaic maps. The question arises as to whether these mosaic maps may not be superimposed on a plaster cast relief of the same area.

Considerable experimenting and work along this line has been conducted by the Topographical Survey and it is anticipated that various difficulties in the way of the successful construction of this type of relief map will be finally solved.

IMPROVED METHODS OF MAKING RELIEF MAPS

Topographical Survey, Department of the Interior, Produces Interesting and Informative Models

An important feature of the work of the Topographical Survey, Department of the Interior, is the making of relief maps which are used in many varied ways. A relief map is a model to scale of the country it represents. On it mountains, streams, plains, hills, and other topographical features are shown in miniature, and from it one can gain a very complete knowledge of the country.

Relief maps are not new. Indeed history records that about a thousand years ago the first relief maps were made in China. These were crude affairs, very different from present day examples.

The modern method as used in the Topographical Survey at Ottawa is to build an original model of sufficient successive layers of cardboard cut to conform to the lay of the ground to give the desired scale. They are attached to one another with rubber cement. Thus with paper one-twentieth of an inch thick and a separate sheet used for each 50-foot contour, one inch of elevation on a model represents 1,000 feet on the ground. These layers are built on a flat base. The whole structure then has a "stepped" appearance as though it were constructed in blocks like the pyramids of Egypt. To make it more natural it is graded or sloped off, using hot wax to fill the interstices.

From the model a mould is made with plaster of Paris, and this mould is used in making replicas of the map. When the cast from such a mould is smoothed off, the next operation is to paste a topographical map in colours on the model. This constitutes the most difficult part of the process due to the fact that paper when wet stretches in length sometimes four to six per cent, whereas its breadth may not vary more than a fraction of one per cent. In this process the map paper has to be carefully manipulated so as to occupy its proper position on the model. The model with the map paper superimposed is then varnished to preserve the paper and placed in a glass-covered frame to keep it clean and protect it from injury.

With the development of aerial photography, new possibilities are opened up

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OTTAWA, AUGUST, 1929

Mid-Year Water-Power Review

(Continued from page 1)

signed to include six units of 14,000 h.p. each, three of which will be initially installed. Pouring of concrete commenced in June and it is expected that the plant will be in operation before the end of 1930. A transmission line about 65 miles in length will carry the power to the Flin Flon mine and smelter.

Manitoba.—Two large hydro-electric developments are under construction on the Winnipeg river. The North Western Power Company, a subsidiary of the Winnipeg Electric Company, is making good progress with a development at Seven Sisters falls which will have an ultimate installation of six units of 37,500 h.p. each or a total of 225,000 h.p. It is planned to have the initial installation of three units in operation under partial head before the end of 1930. Further up the river, at Slave Falls, the City of Winnipeg has recently awarded the contract for the construction of a development which will contain eight units of 12,500 h.p. each, or a total of 100,000 h.p. Two of these units will comprise the initial installation which it is expected will be in operation in 1931.

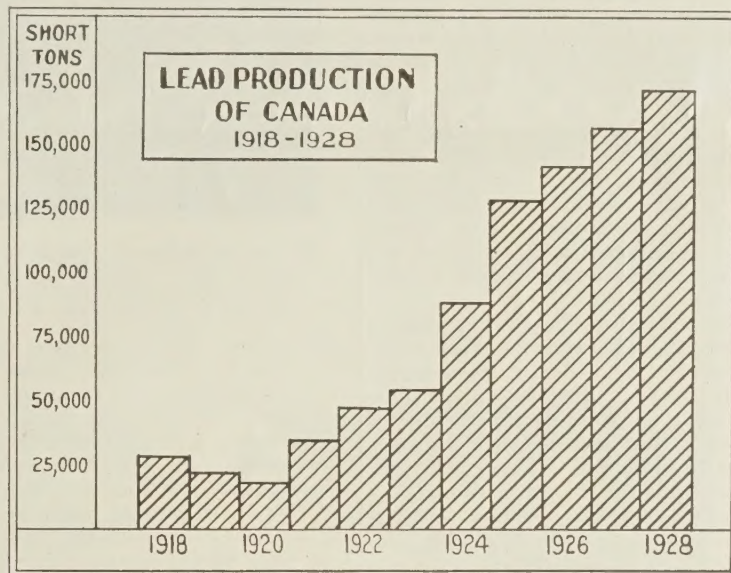
Ontario.—The Ontario Hydro-Electric Power Commission has under way the addition of the tenth unit of 58,000 h.p. capacity, to its Queenston station on the Niagara river. Work has also been resumed on the 54,000 h.p. plant at Alexander Landing, Nipigon river, which it is expected to complete in 1931. The Commission has almost completed, and expects to bring into operation this autumn, an 1,800 h.p. development at Elliott Chute on the South river near North Bay and one of 2,200 h.p. at Tretheway Falls on the South Muskoka river. Construction was recently completed of the Ear Falls storage and power dam at the outlet of Lac Seul on the English river. A power installation of 5,000 h.p. is now proceeding at this dam for the supply of the nearby Red Lake Mining district, completion of which is expected about January, 1930. Work is also under way on a duplicate 220,000 volt line bringing Gatineau river power to Toronto.

In northern Ontario two new developments have recently been completed; one of 28,200 h.p. for the Inter-

CANADA'S ADVANCE AS A LEAD PRODUCER

The rise of Canada's lead output furnishes one of the outstanding features of the Dominion's progress in mineral development during recent years. Lead has been mined in Canada for forty years or more, but within the past decade production has increased at a re-

Copper and lead are the two chief items in the world's consumption of non-ferrous metals. On a tonnage basis lead runs copper a close race. World production of lead in 1928 amounted to 1,846,000 tons as against 1,883,000 tons of copper. According to the figures of the



markable rate—rising from about 25,000 tons in 1918 to over 170,000 tons last year. The great Canadian source is British Columbia which possesses, in the Sullivan mine, the largest lead and zinc mine in the world. Quebec, Ontario, and Yukon Territory also contribute to the output.

American Bureau of Metal Statistics, upon which the accompanying chart is based, Canada took fourth place among the lead-producing countries. Australia held only a slight margin of leadership over Canada—a margin which, in view of the prospects for further growth in the Canadian output, may shortly disappear.

national Nickel Company of Canada at Big Eddy dam on the Spanish river and the other for the Algoma District Power Company at High Falls on the Michipicoten river. The latter has an initial installation of 18,770 h.p., the power being delivered by a newly constructed transmission line to Sault Ste. Marie.

A new development of 13,000 h.p. capacity is in immediate prospect for the Canada Northern Power Corporation at The Upper Notch on the Montreal river about twenty miles from Cobalt. Power from this development will augment the supply for the mines of northern Ontario.

Quebec.—Installations already completed during the present year include, the addition of fourth units to the Chelsea and Farmers developments of Gatineau Power Company of 34,000 h.p. and 24,000 h.p. respectively, and of the second unit of 25,000 h.p. at the Company's Bryson development; the addition of unit number eight of 43,000 h.p. to the Shawinigan Falls development of the Shawinigan Water & Power Company; and the completion of the 5,800 h.p. plant of the City of Sherbrooke at Westbury on the St. Francis river.

Construction is being actively pursued on several large developments. At Chute à Caron on the Saguenay river the Alcoa Power Company is making rapid progress with a development which will have an initial installation of four 65,000 h.p. units scheduled for completion in 1931. The ultimate development is designed for an installation of 1,000,000 h.p. On des Prairies river near Montreal, the Montreal Island Power Company has work well advanced on a development

which will have an initial installation of six 8,800 h.p. units and which it is expected will be in operation late in the present year. The James McLaren Company has a development actively under construction at High Falls on the Lievre river which is designed for an initial installation of 90,000 h.p. and an ultimate capacity of 120,000 h.p. the project also including a twenty-five thousand million cubic feet storage reservoir at Cedar rapids and a 250-ton pulp and paper mill near Buckingham. Gatineau Power Company under the authority of the Quebec Streams Commission has virtually completed a dam at the outlet of Cabonga lake at the headwaters of the Gens-de-Terre river which will impound forty-five thousand million cubic feet of water for the benefit of the Company's power stations on the lower Gatineau river.

Prospective developments in Quebec include those of the Shawinigan Water & Power Company on the upper reach of the St. Maurice river with a projected installation of 1,000,000 h.p. at three or four sites; an 80,000 h.p. development by Gatineau Power Company at Nigger rapids on the Gatineau river, a 30,000 h.p. plant at Chats Falls on the Ottawa river by the Chats Falls Power Company and the 500,000 h.p. development of the Beauharnois Light, Heat & Power Company on the St. Lawrence river. It has also been recently announced that the Shawinigan Water & Power Company under the authority of the Quebec Streams Commission will develop a storage reservoir on the Mattawin river which will warrant the addition of 100,000 h.p. to the Com-

STEADY FLOW OF MOTOR TOURISTS TO PARKS

Banff, Yoho, Kootenay, Waterton Lakes and Jasper National Parks Report Many Visitors

Notwithstanding a late opening due to the backward spring season, tourist travel to Canada's national parks in the Central Rockies promises to equal the record figures of last year. Reports covering the early part of the season from Banff, Kootenay, Yoho, and Waterton Lakes parks show great activity in all these scenic playgrounds and a brisk motor traffic. It is estimated in the National Parks of Canada Branch of the Department of the Interior that approximately 36,000 tourist cars entered these four parks during the period up to July 15. The late departure of the snow from the high passes particularly in Kootenay park slightly lessened the flow of motorists through the western entrance to the Triangle motor tour through Banff, Kootenay, and Yoho parks but the number of cars entering by the Kananaskis or eastern gateway was heavy. During the first two weeks in July, 5,143 cars were admitted at the Kananaskis entrance. The popularity of Waterton Lakes with the motoring public has not diminished and a heavy flow of motor tourists to the southern Alberta playground is indicated by the early figures from that park.

Registrations at the Banff Springs hotel in Banff park, at the Prince of Wales hotel in Waterton Lakes park and at Jasper Lodge in Jasper park, show that many visitors are also travelling by rail to the parks in the Rockies. The numerous recreational attractions of these areas are drawing increasing numbers. Golf, bathing in the hot springs, trail riding, and mountain climbing all have their thousands of devotees and the activity in these different pastimes indicates a busy tourist season in Canada's national playgrounds.

pany's plants at Grand'Mere, Shawinigan Falls and La Gabelle.

New Brunswick.—The Saint John River Power Company has added the second unit of 20,000 h.p. to its development at Grand Falls on the St. John river, the third unit being scheduled for completion towards the end of the year. Construction is also under way of a 132,000 volt transmission line to carry power from Grand Falls to a 500-ton newsprint mill being constructed by the New Brunswick International Paper Company at Dalhousie on Chaleur bay. On Nipisiguit river the Bathurst Power and Paper Company is adding a 5,000 h.p. unit to its hydro-electric station at Grand Falls.

Nova Scotia.—The Nova Scotia Power Commission is actively proceeding with the construction of three developments on the Mersey river, the first at Upper Lake Falls with 7,750 h.p., the second at Lower Lake Falls with 10,600 h.p. and the third at Big Falls with 12,700 h.p. This power will fulfil a contract with the Mersey Paper Company which calls for the delivery of 20,000 h.p. on January, 1, 1930, to supply a paper mill which that Company is building at Brooklyn near Liverpool. The Commission is also constructing a 3,000 h.p. development at Tusket Falls on the Tusket river to fulfil a contract with the Western Nova Scotia Electric Company and the Cosmos Imperial Mills Limited both of Yarmouth. It is expected power delivery will commence about September 1 of the present year.

CIVIL AVIATION IN CANADA*

Progress in Commercial Flying Since 1919—Air Mail Service and Aeroplane Clubs

Civil aviation in Canada has become an important factor in the many phases of the business and community life of the Dominion. It is just ten years since civil aviation began in the Dominion, when, after experiments carried out by the Federal Government in forest fire protection, a commercial aviation company obtained a contract from the Quebec Provincial Government to patrol a large area of forest land in the St. Maurice valley for fire detection during the summer of 1919. Since this beginning progress has been steady and new developments in aircraft and methods of operation have aided greatly in the general advancement of this branch of flying.

Many uses have been found for aircraft which include forest fire detection and suppression; timber cruising; air photography; transportation of passengers, express and mail; instruction; advertising; sightseeing; and "joy-riding". Sixty-two organizations or individuals are now engaged in civil flying, including the Ontario Provincial Air Service, while twenty-one Light Aeroplane Clubs are in operation. There are 330 aircraft licensed for commercial use in the Dominion, by the Department of National Defence, and 278 commercial pilots and 253 air engineers hold certificates. Fifty-three airports and seaplane ports are similarly licensed, while a large number of municipalities in every province are giving consideration to the construction of airports. Nine schools of flying are conducted and a large number of pupils are receiving instruction. In addition, there are twenty-two private owners of aircraft, and 221 licensed private pilots.

Apart from the forest areas, which are patrolled during the season of fire hazard each year by Dominion Government, Ontario Provincial Government, and commercial operators, covering some 250,000,000 acres, perhaps the most important part being played by aircraft is in connection with mineral development in the northern parts of the Dominion. Commercial companies have been formed, and without assistance or subsidy from the Government, have successfully organized the northland with adequate fuel caches so that to-day every district is within flying range of a base. Flying in these regions is continuous throughout the year. The numerous lakes and rivers which abound everywhere in northern Canada provide suitable alighting places for float seaplanes in summer and the frozen surfaces provide good landings in winter. Cabin aircraft and air-cooled engines enable flying to continue under the most severe weather conditions. Hundreds of tons of equipment and freight have been transported, mails delivered, and mining executives, prospectors, and employees conveyed to and from the scenes of activity.

Another important phase of development is the carriage of mail by air, linking scattered communities and annihilating distance. Eighteen months ago mail was delivered to a few outlying districts under special arrangement be-

tween the Post Office Department and commercial operators. In December, 1927, the Postmaster General awarded the first contract for the carriage of mail between Leamington and Pelee island, Ontario, for the period of closed navigation. Since then extensions of the air mail service have been made and in 1928 there were ten services in operation. This year further extensions are being made with the ultimate object of establishing a main trunk line from the Atlantic to the Pacific, with feeder lines from other centres. The Department of National Defence plays an important part in the organization of these airways.

The services at present in operation under contracts with the Post Office Department are:—*Winter*: Leamington-Pelee island. Quebec-Seven islands-Anticosti. Moncton-Charlottetown. Moncton-Magdalen islands. *Summer*: Rimouski-Montreal-Ottawa. Lac du Bonnet-Wadhope-Bissett. *Yearly*: Montreal-Toronto-Windsor-Detroit. Montreal-Albany, N.Y. Toronto-Buffalo. Winnipeg-Regina-Calgary-Banff-Regina-Edmonton, via Saskatoon. Sioux Lookout-Red Lake Area. Kississing-The Pas.

During 1928, 316,631 pounds of mail were conveyed, of which 277,184 pounds were carried under Post Office contracts. For the first six months of this year 245,750 pounds have been carried by contractors. Certain routes operated throughout the year are being lighted and radio beacons will be erected by the Department of National Defence to enable the mail to be conveyed rapidly during the hours of darkness. Special services are run between Waterways and Simpson, on the Mackenzie river, with occasional trips to Good Hope on the Arctic circle, and from Whitehorse to Dawson, Yukon Territory. An experimental service was run over the route Ottawa-Montreal-St. John-Halifax, during last winter, with a view to hastening the trans-Atlantic mails throughout the year.

The Light Aeroplane Club movement, inaugurated in the autumn of 1927 by the Department of National Defence to encourage aviation, has shown splendid results. Twenty-one clubs are active and it is expected that three more clubs will receive the Government grant of two aircraft in the near future. These clubs have a membership of 4,248 of which 279 are solo pilots; and have to their credit a total of 5,975 hours in the air to date this year. One hundred and fifty-eight Private Pilot and forty-seven Commercial Pilot licences have been obtained by members. Besides stimulating public interest in flying, the clubs ensure good aerodromes wherever they are established, which is one of the urgent needs of to-day.

The construction of an airship base and airport at St. Hubert, near Montreal, followed the decision of the Dominion to participate in Empire air communication by airship. A mooring tower has been erected and equipped with the most efficient machinery obtainable for the reception of the British airship R.101, which is expected to make its first trans-Atlantic passage in the autumn of this year. An aerodrome, comprising 792 acres, is being constructed



Civil Aviation in Canada—A section of the airdrome at St. Hubert, near Montreal, taken from the air. This is one of Canada's most active airports. The huge mooring tower erected for the reception of trans-Atlantic airships is situated to the northeast of this part of the field. Inset, a plane taking on mail at the St. Hubert airdrome.

which, when completed, will rank as one of the finest in the world. A number of commercial aviation companies use St. Hubert for passenger, freight, and mail services. It is the terminal for the International Air Services between Montreal and New York, and Montreal and Detroit. Radio and meteorological stations have been established, and facilities installed for broadcasting reports to operators over established routes.

The progress of civil aviation each year since 1925 is indicated by the following figures. They include commercial operators, the Ontario Provincial Air Service, and Light Aeroplane Clubs:—

	1925	1926	1927	1928
Operating Firms...	8	14	20	53
Hours				
Flown...	4,091	5,860	12,070	43,071
Passengers				
Carried...	4,897	6,436	18,932	74,669
Passenger-miles...	446,648	631,715	1,424,031	2,833,782
Freight				
Carried (Pounds)...	592,220	724,721	1,098,346	2,404,682
Mail (Pounds)...	1,080	3,960	14,684	316,631

Canada's Arctic Expedition on Annual Patrol

(Continued from page 1)

on the *Beothic*, going aboard at Lake Harbour.

Five members of the Royal Canadian Mounted Police are also on board the *Beothic*, going North to relieve officers who have completed their respective periods of northern service. They are: Constables R. J. Kidston, J. C. M. Wishart, W. B. MacGregor, A. M. McKellar, and W. P. Fraser. Four members of the Force will return south, namely, Sergt. J. E. F. Wight and Constable P. Dersch from Lake Harbour; Corp. E. Anstead from Bache Peninsula; and Constable S. H. G. Margetts from Pond Inlet.

After leaving North Sydney on the afternoon of July 20, the *Beothic* headed across the gulf of St. Lawrence and passed through the strait of Belle Isle on the evening of the 21st. The weather was fine but as soon as the ship turned northward, an unusual number of icebergs was sighted. Dense fog was encountered every day during the crossing to Godhavn, Greenland, the first port of call, while the rough sea, strong southeast and east winds, and rain made this part of the voyage an unpleasant one. On Saturday morning, July 27, the expedition arrived at Godhavn but owing to the heavy fog, the ship did not enter the harbour

GATINEAU RIVER NAMED AFTER EARLY TRADER

First Record of Name Made in 1783 According to Geographic Board of Canada

When Champlain in his ascent of the Ottawa river in 1613 reached what is now the site of the capital of the Dominion on June 4 he noticed a tributary coming from the north. The river was the Gatineau. Champlain gives no name to it and as far as the Geographic Board of Canada is aware the first record of any name for the river does not occur till 1783. In that year Lieut David Jones made a report to Governor Haldimand on the suitability of land on the Ottawa for United Empire Loyalist settlement. In this he mentions coming "to the River Lettinoo [Gatineau] and from thence about a league to Shoadear [Chaudiere] Falls." At "River Lettinoo" the land "appeared to be good near the Bank of the Grand [Ottawa] River but Back full of marshes."

The river is not shown by name on any maps in the Geographic Board's collection till 1831. A plan of the Rideau canal by Col. By in that year shows "Gattenno River" as a short stream.

The name seems to commemorate Nicolas Gastineau or Gatineau of Three Rivers who engaged in the fur trade from 1650 till his death about 1683. Gatineau, and his sons after him, traded with the Algonquins of the St. Maurice river. Whether his name was applied to the river which now bears it because he descended the river, whose source is near that of the St. Maurice, or because he traded with the Indians at its junction with the Ottawa is a matter of surmise.

until 10 o'clock. The usual courtesies of these good-will visits to the seat of local government in North Greenland were exchanged between Mr. George P. Mackenzie, Officer in Charge of the Canadian expedition, and Governor Rosendahl, of North Greenland. At 8 p.m. the same day the *Beothic* was headed for Dundas Harbour, Devon Island, the first of the Canadian posts to be visited. Exactly three days later the ship had successfully navigated the great middle pack of ice in Baffin Bay and was proceeding to Dundas Harbour under fair weather conditions.

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ARCTIC PATROL SHIP NEARS END OF VOYAGE

Department of the Interior's 1929 Expedition Expected Home Early in September

The Canadian Government's annual expedition to the posts on the eastern islands of the Arctic archipelago is nearing the completion of its work and the return of the ship to the home port of North Sydney, Nova Scotia, is expected early in September. The northern party, which is in charge of Mr. George P. Mackenzie of the North West Territories and Yukon Branch, of the Department of the Interior, sailed on board the ss. *Beothic* for the annual patrol on July 20, and on the morning of July 27 had completed the 1,800-mile voyage to Godhavn, Greenland, the first port of call. After an exchange of courtesies with the Danish officials at that point, the ship continued north and west to Dundas Harbour, Devon island, which was reached on the morning of July 31. At noon the following day the ship resumed its voyage and a short call was made at Craig Harbour on Ellesmere island the same day. The *Beothic* also stopped off Cape Sparbo while photographs, both still and motion, were taken of the herds of musk-ox at that point.

Continuing north the *Beothic* entered Smith sound on August 2 and after battling heavy ice reached Rice strait the next day. A great unbroken ice field in Buchanan bay barred the further progress of the ship towards Bache Peninsula and the supplies had to be landed at Cape Rutherford within easy hauling distance of the post. Inspector A. H. Joy, of the Royal Canadian Mounted Police, Constable Taggart, and an Eskimo named Noocapungwah, who had completed one of the most important overland patrols ever made among the Arctic islands, were at Bache Peninsula and went aboard the ship. Inspector Joy's party left Dundas Harbour on March 12 for a patrol west to Melville island, during which they visited, in addition to Melville island, Loughheed, King Christian, Ellef Ringnes, Amund Ringnes, Cornwall, Axel Heiberg, and Ellesmere islands, covering roughly 1,800 miles.

Turning south from the farthest north post, the *Beothic* paid a second visit to Dundas Harbour where Inspector Joy completed arrangements for his return to Ottawa with the expedition. At midnight on August 7, the expedition reached Pond Inlet at the northern end of Baffin island. The inlet was found full of ice but the ship forced a way to a position close enough to land supplies and make the necessary inspection and change of personnel. At 7 o'clock on the evening of the 8th the voyage was continued south along the Baffin island coast. On the

(Continued on page 3)

CANADA'S HUNTING ATTRACTIONS

Every Part of Dominion Has Its Own Special Appeal
—Game is Plentiful

The physical characteristics of Canada—its innumerable lakes, extensive forests, and great open prairies—combine with its natural geographical situation to constitute a distinct faunal region within which is to be found al-

The claim is made for these provinces that they harbour more moose to the square mile than any other portion of Canada. This statement is backed up by the number of splendid trophies taken annually.



Hunting in Canada—A party of hunters starting out by canoe on a hunting trip in northern Ontario. Moose, deer, bear, and other game animals abound here as in other parts of Canada.

most every species of game native to the North American continent. From the summarized description of the game conditions prevailing in Canada as outlined below, it will be observed that each province possesses certain attractions for the sportsman in common with all the provinces, and also certain attractions peculiar to itself. Whatever portion of Canada happens to be most readily accessible, there the sportsman will find game, and a few hours' travel will bring him within reach of favoured hunting grounds.

The provinces of Nova Scotia and New Brunswick, with their old-world atmosphere, may be described as a country of easy distances, as the game areas are practically forests in the midst of civilization. These provinces have for years attracted thousands of sportsmen from all over the world, who enjoy the less strenuous hunting trip and at the same time wish to be reasonably sure of obtaining game. Moose and deer are the chief attraction, but bear, wildcat, rabbit, ducks, geese, brant and other small game are also plentiful.

The provinces of Ontario and Quebec include within their boundaries some of the finest hunting territory in America. In some districts in Quebec the hunting rights on certain tracts of land are leased to organized clubs, and upon these preserves hunting can only be done with the permission of the lessee. There are, however, large tracts of public land in the different game areas which are open for hunting to all licence holders, and where such game as moose, deer, bear, wolf, rabbit, partridge, geese, ducks, and other small and feathered game may be had in abundance. In Ontario, there is such a large number of excellent hunting districts, that the hunter in making a choice need be governed only by the distance he wishes to travel, and the kind of game he prefers to hunt. Good hunting for game birds, small game and deer, may be had close to the settled districts in southern Ontario. The real big game territory has, however, been fixed by sportsmen as that vast country lying north and west of the French

(Continued on page 2)

THE NATION'S BUSINESS AND AGRICULTURE

Radio Address by Honourable Dr. W. R. Motherwell, Minister of Agriculture

"The Nation's Business and Agriculture" was the subject of the fourth of the series of radio addresses by Ministers of the Crown delivered over the broadcasting network of the Canadian National Railways. On Thursday evening, August 30, Honourable W. R. Motherwell, Dominion Minister of Agriculture, reviewed briefly and ably Canada's position as an agricultural nation. He opened his remarks by showing the leading place of agriculture among the nation's great industries and how largely the products of our farms bulk in the export trade of the Dominion. What the Department of Agriculture was doing to bring the resources of scientific research and of effective organization to the assistance of agriculture was then dealt with by Hon. Mr. Motherwell. He outlined the policies adopted for the improvement of farm products, such as fruit inspection, egg and cheese grading, the introduction of better types of farm animals, the development of new and improved varieties of wheat and other cereals, grasses, fruits, vegetables, flowers, etc., and the protection of livestock and crops against disease, fungus, and insects. In concluding, Hon. Dr. Motherwell stated that in a comparatively young country like Canada, agriculture was in itself to a very large extent the nation's business as it represented half the population of the Dominion and fed the whole.

Copies of this radio address in full may be obtained upon application to the Department of Agriculture, Ottawa.

ALBERTA OIL PRODUCTION IS RAPIDLY GROWING

June Figure Nears 100,000-Barrel Mark—
Six Months' Total

The Alberta oil production figures for June, 1929, compared with the figures for the same month 1928, and also a comparison of the production for the first six months of 1929 with the same period in 1928 are as follows:—

	Naphtha 60° or over (brls.)	Light Crude 30° to 60° (brls.)	Heavy Crude Below 30° (brls.)	Total (brls.)
June, 1929 ...	90,227	3,865	2,700	96,792
June, 1928 ...	39,069	7,530	841	47,440
Jan. to June, 1929 (incl.)...	365,656	36,643	6,516	408,815
Jan. to June, 1928 (incl.)...	192,978	34,625	4,692	232,295

Jack pine is now used more than any other species for ties in Canada. Its adaptability to creosote treatment, and its natural strength have made of this species a valuable material for this purpose.

CANADA'S IMMENSE NICKEL DEPOSITS*

Sudbury Mines Contribute About 90 Per Cent of the World's Production

It is generally known that the mines of the Sudbury district of Ontario contribute about 90 per cent of the world's production of nickel, and that development during the past few years has proved the existence of large deposits carrying high values in copper and in metals of the platinum group as well as in nickel.

In the past two years there has been a rapid increase in the use of both refinery and mill nickel products. According to the International Nickel Company of Canada, sales of metallic nickel in the United States during 1928 were approximately 97 per cent in excess of those of the previous year, and world sales of nickel, exclusive of the United States, increased approximately 52 per cent. Coincident with this large increase in the consumption of metallic nickel the sales of nickel products from the Huntington works (principally Monel metal and rolled nickel) increased 35 per cent. The company attributes this expansion not only to generally good business conditions, but largely to new applications of nickel introduced through the efforts of its technical and sales organizations. Also a vast amount of nickel steel scrap accumulated during the world war has been consumed, and steelmakers are consequently increasing their purchases of metallic nickel.

The merger in 1928 of the International Nickel Company and of the Mond Nickel Company has resulted in the mines and smelters of both companies in the Sudbury district coming under one control. Extensive plans for the increase of mining, smelting and refining operations are being rapidly pushed forward, and the capacity of the smelters near Sudbury and the nickel refinery at Port Colborne, Ontario, are being increased. A copper refinery and sulphuric acid plant are also being erected near Sudbury. The completion of this program should result in a further large increase in the Canadian output of nickel and copper and of metals of the platinum group.

In addition to these operations, prospecting and development work is being done in the Sudbury district by a few independent operators. Foremost among these are the operations of the Falconbridge Nickel Mines which has proved the existence on its property of large ore bodies and is proceeding rapidly with the erection of a concentrator and a 200-ton smelter. Development is also being carried on by the Consolidated Mining and Smelting Company on its nickel-copper property at Rotenstone lake in northern Saskatchewan, where an apparently important discovery was made in 1928.

The Canadian production of nickel in 1928 amounted to about 48,400 short tons as against 33,400 short tons in 1927, and these figures will probably be largely exceeded by the 1929 output, production for the first three months of 1929 being about 3,400 tons greater than for the corresponding period in 1928.

*Prepared at the direction of Dr. Charles Camell, Deputy Minister of Mines, Canada, by Mr. Arthur Buisson, Mines Branch.



Hunting Hungarian Partridge on the Prairies of Western Canada—Similar scenes may be witnessed in the autumn in every province of Canada where the shooting of game birds such as partridge, prairie chicken, woodcock, and quail attracts thousands of sportsmen.

CANADA'S HUNTING ATTRACTIONS

(Continued from page 1)

river, where game such as moose, deer, bear, wolf and rabbit are found in large numbers.

The prairie sections of Manitoba, Saskatchewan, and Alberta are the haunts of ducks, geese, brant, and other wildfowl, and some of the best shooting locations in America are to be found in these provinces. The northern forested sections of all three provinces are well supplied with moose, deer, caribou, and bear, as well as with birds and small game.

The province of British Columbia and the mountainous or western portion of Alberta present a striking contrast to the other sections of Canada, both in the species of game available, and the methods of hunting. In this rugged region of splendid scenery, the sportsman has a chance for species of game that are found only in this section of Canada. These include mountain sheep, mountain goat, cougar or mountain lion, and grizzly bear—king of American game animals. In addition, there is an abundant supply of other game such as moose, deer of several species, two species of caribou, black and brown bear, as well as a variety of game birds.

According to sportsmen who have hunted in all parts of the world, there are no finer big game fields than those of the Yukon. In addition to the many species of big game, which include mountain sheep, mountain goat, moose, caribou, grizzly, brown, and black bear, the country has an impelling attraction for the tourist who delights in exploring the wonders and beauties of nature in a wild and rugged country. Although requiring longer travel to reach it than other sections of Canada, the Yukon is readily accessible by boat from Vancouver or Prince Rupert to Skagway, Alaska, and thence by train over the White Pass and Yukon railway to Whitehorse from which point travel to the hunting grounds is concluded by automobile, wagon, boat or pack train, everything necessary for a pleasant journey being provided by the transportation companies and outfitters.

The entire Dominion is opened up by highways, railways, and steamship or air lines, so that the sportsman is conveyed in comfort to his "going-in" place. At established points he will find accommodation and also outfitters who are prepared to furnish guides, canoes, camping equipment, pack trains, and everything necessary for a trip through the country in which he decides to hunt.

ASTRONOMERS COMPLETE GRAVITY COMPARISON

Dominion Observatory Carries Out Pendulum Observations in Europe and America

The Dominion Observatory, Ottawa, has just completed a series of pendulum observations at base stations in Europe and America that is considered to be the most accurate gravity comparison between the two continents that has ever been made. The selected stations were the Dominion Observatory which is the gravity base for Canada; the Royal Observatory, Greenwich, the base for Great Britain; the Geodetic Institute at Potsdam, Germany, the base station to which all gravity stations throughout the world are referred; and the Coast and Geodetic Survey Office, Washington, the base for the United States.

The first purpose of the work was to determine the gravity relation that exists between Ottawa and the above-mentioned bases so that the 116 gravity stations already established in various parts of Canada and the resulting investigations may be compared with similar stations and investigations of the earth's crust in other countries throughout the world. From the purely scientific point of view the results of the work have an important bearing on the theoretical shape of the earth—the question as to whether the equator is a circle or an almost round ellipse—and also upon the general equilibrium of the earth's crust. Without going into detail it may be stated that the results of the recent determination by the Observatory indicate that the general equilibrium is more complete and the equator more nearly circular than previous international gravity observations would indicate. While the result for Greenwich agrees well with that established by other observers, the values for Ottawa and Washington were found to be somewhat greater than the previously adopted values.

Apart from this, the work has a definite practical value which has not been lost sight of among the other considerations. Determinations of gravity, along with other physical methods, have been found to be of great practical value in the discovery of minerals and the tracing of geological structure. There is no doubt that these methods will be much developed in the future, a development to which the Dominion Observatory is contributing.

(Continued on page 4)

CANADA'S EEL FISHERY IS AN IMPORTANT ONE

Facts About the Industry—Interesting Notes on Habits of this Fish

Canada's eel fishery holds a place of importance in the Eastern coastal fisheries of the Dominion according to statements contained in a forthcoming publication of the Department of Marine and Fisheries on the Atlantic Fisheries. The chapter headed, "The Eel Fishery", contains some interesting facts about the habits of the eel and the present standing of the industry.

Early explorers of Canada made reference to the importance of the eel fishery carried on by the Indians. Today, the eel, which is highly esteemed in Europe and the northern United States as a table delicacy, is found widely distributed in the rivers and streams emptying into the gulf of St. Lawrence and the Atlantic ocean. However, notwithstanding the prominent place held by the eel in our fishery exports, the domestic consumption remains limited.

The commercial eel fishery is carried on chiefly in Quebec, particularly along the Richelieu river and along the St. Lawrence as far down as the Isle of Orleans. The rivers of Levis and Lotbiniere counties yield the largest quantities. The total annual catch for Quebec is about 2,000,000 pounds. The catch in Nova Scotia is over 70,000 pounds; in New Brunswick, 16,000 pounds; and in Prince Edward Island, 13,000 pounds. Considerable shipments of live eels are made to the United States in specially constructed well-smacks.

Few fish have been the subject of greater controversy and research than the eel, common to the North Atlantic coasts of both America and Europe. While it was known to be catadromous (going from fresh or brackish water to the sea for spawning, as distinguished from the anadromous fish that come from the sea to fresh water for that purpose), it was not until recently that the mystery of its spawning-place was solved. It was discovered that spawning takes place in the ocean south of the Bermuda islands, from whence the young make their migration to American and European waters. When they arrive in the rivers they are about three inches long. They remain in the rivers for two or three years until the approach of the reproductive stage, when they make the return journey to the waters of their nativity for spawning. Only the young move up-stream. Adults move downward, and do not return. Both males and females die at sea after their first and only spawning period.

It should be noted, to avoid confusion, that neither the lamprey eel, so-called, nor the hag eel, or hag fish are in any way related to the eel family. Both the lamprey and the hag are parasites, and the only resemblance to the eel is the elongated body. They are both easily distinguishable from the eel, which has the jaw typical of all true boned fishes, while the lamprey and hag are without jaws. The lamprey, which has a round disk-shaped mouth, attaches itself to the body of salmon or other fish, rasping its way to the flesh upon which it feeds. On the other hand the hag, which has a pointed mouth, bores its way into the body of the fish, feeding upon the flesh until only the skin is left. The common eel is not guilty of parasitic habits.

The usual fishing method is to set traps or pots across the river at strategic points. These traps have a hinged cover and are enclosed completely except for a hole at the bottom of the upstream side. A funnel-shaped entrance leads into the trap through the

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OTTAWA, SEPTEMBER, 1929

PROGRESS OF FOREST RESEARCH IN CANADA

Silvicultural Work of Department of the Interior Now Extends to All Provinces

The forests of Canada are, in the aggregate, the second most important natural resource, being exceeded in actual value of products by agriculture alone. During the early history of Canada there was a period, when white pine lumbering was at its height, in which forest products represented over 37 per cent of Canada's annual exports. But although agricultural research has long been established and numerous experiment stations located throughout the country, silvicultural research (scientific study of the art of growing forests) may be said to be still in its infancy. Some eleven years ago a beginning was made in silvicultural research by the Forest Service of the Department of the Interior with problems in the eastern forests. Since that time the work has gradually extended to all provinces of the Dominion.

Forests, unlike most natural resources, are replaceable and if handled correctly may be rightly considered as inexhaustible, as nature will renew the crop after the mature one has been removed. In fact, as is true in agriculture, the crop can be greatly improved by correct silvicultural practice. Nature, if left to her own devices, is wasteful of time and material. She may produce a crop of sorts and of species that are not presently valuable, but, if assisted by wise management, there will be developed a much larger crop of more valuable species.

The most pressing forest problem in Canada, obviously, is the regeneration of forest types under the varied conditions found from Nova Scotia to British Columbia. While silvicultural methods have long been defined in parts of Europe, similar treatment is not applicable in Canada where logging practice and market requirements as well as tree species, soil and climatic conditions vary radically. The art of silviculture must be developed especially for Canada. Only by experiment and research can the factors which control the regeneration of our Canadian spe-

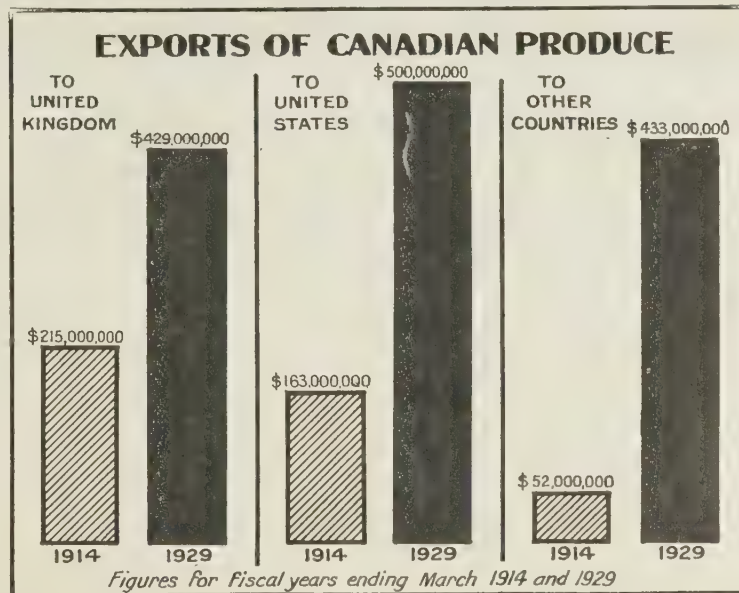
THE GROWTH OF CANADA'S EXPORTS

Nowhere is the advance in the development of Canada's resources more vividly reflected than in the records of the Dominion's export trade. The sheer increase in the value of that trade is amazing enough in itself, but no less astonishing is the manner in which Canada's exports have spread out into new channels.

The United Kingdom and the United States have long been Canada's two great customers, and until recent years

dian products. They bought from the Dominion last year a bill of goods greater in value than the whole export trade of Canada fifteen years ago.

To these widely scattered and lesser-known markets Canada's resources furnish an immense variety of products in natural and manufactured forms. Silver and artificial silk to India, newsprint and sardines to Australia, potatoes to Cuba, lead and lumber to Japan, herring to China, foxes and



other countries have taken only a minor share of the Dominion's exports. Within the past fifteen years a remarkable change has occurred. During that period the Dominion's sales to the United Kingdom have doubled in value, those to the United States have trebled, and at the same time exports to "Other Countries" have risen more than seven-fold. These "Other Countries," formerly a minor factor, now afford a huge market outlet for Cana-

oies in the widely different sites and types be determined. This predicated the establishment of experimental cutting areas on which certain well-known methods, and variations of them to suit conditions of utilization, are employed in removing the mature crop.

During the last ten years several large experimental cutting areas, ranging in size from 200 to 500 acres each, have been established in Nova Scotia, New Brunswick, Quebec, Ontario and Saskatchewan. These are being carefully studied at five-year periods and the results of the various methods analyzed and compared. On extensive areas of the National Forests, the practice of marking the trees to be cut has been followed, that is selection cutting has been practised, and the effect upon the remaining stand and upon reproduction are under systematic observation. Throughout all the provinces permanent sample plots, upon which each tree is numbered and carefully measured, have been established. These plots will be remeasured from time to time to obtain a record of the conditions following logging. This work must be extended to include all the broad types and districts in Canada, before the management of our forests can be placed on a basis to ensure adequate regeneration of the desirable species.

Having successfully regenerated a stand is, however, only the first step in

lobsters to Sweden, oats and nickel to the Netherlands, salmon and furs to France, cheese and furniture to South Africa, rye to Norway, zinc and asbestos to Germany, codfish and copper wire to Brazil, aluminium and wood-pulp to Italy, and, of course, wheat and flour to all quarters of the globe—these and a thousand and one other items help to extend the web of Canadian commerce across the seven seas.

forest management. The care of the stand throughout its life is also of great importance. If the method of regeneration has resulted in a stand of even age, it is necessary to thin it at intervals to obtain the most satisfactory results. By this practice not only will the resultant stand be very much more valuable, and merchantable size reached ten to thirty years earlier, but the thinnings obtained may amount in quantity to almost as much as the final stand. Where they can be utilized thinnings can be looked upon as a valuable by-product of forest management.

These are only two broad silvicultural problems which form the basis of experimentation and research already well under way. Problems in nursery practice, seeding, planting, forest mensuration and protection, and many others are constantly arising and waiting for some authoritative investigation. Many of them are now being studied by the Forest Service.

Losses from Insects

The Dominion Entomologist, Mr. Arthur Gibson, estimates that in the aggregate insects cost Canada well over \$100,000,000 annually. This is the loss to field crops and to it must be added the loss to forest and shade trees, stored products, etc. While these latter losses are difficult to estimate they easily average over \$50,000,000 a year.

INTERESTING PAMPHLET DESCRIBES THE YUKON

Department of the Interior Issues Booklet on Tourist and Other Attractions

At the direction of Hon. Charles Stewart, Minister of the Interior, an illustrated pamphlet of 46 pages has just been issued entitled "Yukon: The Land of the Klondike." Many people still think of Yukon Territory in the terms of the great gold rush of thirty years ago and of the \$200,000,000 worth of placer gold which has been dug out of the creeks and hills since that famous stampede—one of the greatest in history. Yukon Territory has changed much since then. So far as placer mining is concerned the individual miner with pick and shovel has given place to the incorporated company operating gigantic electric dredges and hydraulic plants, and there has been the development of quartz mining in silver-lead ores. Mining is still the great industry of the Territory but the export of furs, from the forests and, lately, from the fur farms is important, and there is the rapidly rising tourist trade. This latter is the chief reason for the issue of this pamphlet. The flow of tourists to Yukon Territory is in two streams: the one drawn by the big-game hunting in the autumn, and the other attracted by the magnificent scenery through the great mountain ranges and down the mighty rivers to the Land of the Midnight Sun. During the season, at least one boat each day, from Vancouver, Victoria and other Pacific Coast ports, lands passengers at Skagway, Alaska, for the railway run over the White Pass to Whitehorse, Y.T., and for the steamer trip down the Yukon river.

The pamphlet describes this route and the various side trips which may be taken. The text and the excellent pictures give a clear idea of the wonders and beauties of Yukon Territory and of the completeness and comfort of the modern way of travelling over this thrilling and one-time perilous route. Copies may be had free upon application to the Director of the North West Territories and Yukon Branch, Department of the Interior, Ottawa.

ARCTIC PATROL SHIP NEARS END OF VOYAGE

(Continued from page 1)

9th the ship touched at Clyde River, a native settlement and trading post. Heavy ice was encountered throughout the trip south, great ice fields extending for fifty miles out into Baffin bay. On the afternoon of the 13th the expedition reached Pangnirtung on Cumberland sound. Dr. Livingstone, Chief Medical Health Officer of the North West Territories and Yukon Branch, who spent the past year among the natives of Baffin island, came aboard at this point and Dr. H. A. Stuart disembarked to continue the work. At 4 a.m. on the 15th the *Boethic* left Pangnirtung for Lake Harbour, on the southern coast of Baffin island, which post was reached on August 17. The following day the ship headed west through Hudson strait for Chesterfield where a medical post will be established for the benefit of the white and native population of the district surrounding Chesterfield inlet and Baker lake.

Nova Scotia, New Brunswick, and British Columbia produce bituminous coal only; Saskatchewan produces lignite; and Alberta produces bituminous, sub-bituminous and lignite coals.

HOW CANADA IS BEING MAPPED FROM THE AIR

Topographical Survey, Dept. of the Interior,
Uses Vertical and Oblique Photographs
for Map Making

In compiling maps in the Topographical Survey of the Department of the Interior by aerial photographic methods, two types of photographs are employed, namely, the vertical and the oblique. The oblique photograph may be used for plotting maps to a scale of four miles to an inch or to smaller scales for areas such as exist in parts of northern Canada where the topographical detail lies practically upon the same plane. The vertical photograph is used, in general, for plotting maps to larger scales than with the oblique.

For the production of maps by vertical photography, a larger number of photographs is required for the same area than by the oblique method. One thousand vertical photographs exposed at the usual altitude of 10,000 feet with an 8-inch lens will map some 650 square miles, while the same number of oblique photographs taken with the same camera equipment at an altitude of 5,000 feet will map five times that area.

For vertical work, a special type of cabin monoplane is largely used by the Royal Canadian Air Force, its particular advantage being that the personnel is relieved from wind pressure and cold. For oblique work the flying boat with a free nose is, at present, used exclusively. In the latter the camera is mounted on a circular track rigidly fastened to the cowling of the cockpit in the nose of the boat. With this mounting the camera can be traversed through a horizontal arc of 180 degrees; it can be locked in any position of its traverse; and it can also be depressed to any angle that may be required. To deaden the vibration its contact with the boat is made through strong flexible rubber cables.

Three men generally comprise the crew of a party engaged in taking aerial photographs: the navigator, the pilot, and the camera operator. The navigator is an officer of the Topographical Survey, and the other members of the crew are members of the staff of the Royal Canadian Air Force. The latter organization supplies the plane and looks after its maintenance and actual performance in the field. Included among the pilot's duties is the requirement to fly the craft so far as possible on a straight and level course at a uniform speed along the route as projected.

The navigator, who is always a commissioned Dominion Land Surveyor of wide field experience, directs the pilot in his efforts to follow as exactly as possible the projected ground trace of the flight line. The ground speed of the craft—a particular consideration in vertical work where each photograph must overlap its neighbours by over fifty per cent in the direction of flight—is determined by a special camera sight. For oblique work, in order to keep a check upon the altitude of the plane, he records barometer readings for each set of pictures.

When the wind is sufficiently strong from either side to influence the direction of the craft, it will "drift" to the right or left of the theoretical straight line which the plane is endeavouring to follow. In order to overcome this drift, the craft is nosed gently



Placing Bench Marks in Our Public Parks—Checking the elevation figures before they are inscribed on the plate on the top of a newly erected monument in a public park at Sault Ste. Marie, Ontario.

ASTRONOMERS COMPLETE GRAVITY COMPARISON

(Continued from page 2)

Although the observatory pendulum apparatus consists of three pendulums and two knife-edges, in effect the determinations were made by allowing a pendulum to swing freely in an air-exhausted chamber for a period of two weeks and determining accurately at each place how much the pendulum lost or gained. At each place the pendulum was compared daily with the accurate time from the national clocks supplied by the institutions in which the observations were made. On taking the pendulum from Ottawa to Greenwich it was found that owing to the

change in gravity the pendulum gained about two minutes and fifty seconds per week; at Potsdam, about three minutes and forty-two seconds. At Washington it lost about two minutes and thirty-six seconds in the same time. From these results the comparative values of gravity at the four bases are determined by a quite simple computation. An increase in gravity makes the pendulum go faster. Gravity itself changes with latitude and height above sea level and is influenced also by local and general distribution of material in the earth's crust.

While the observer was making the pendulum observations abroad an excellent opportunity was afforded to study the methods of gravity surveys in other countries. Heretofore, especially in North America, the chief drawback to pendulum work has been the great length of time required to make accurate determination of gravity. In spite of this and the limited number of stations it has been possible to establish, areas of gravity anomaly have already been located in Canada which are undoubtedly due to local peculiarities in the earth's crust, and which may in the case of the prairies be indirectly of economic importance. Partly as a result of the experience gained abroad, improvements in the method of observing are being investigated which give promise of shortening considerably the time required to make determinations, and this it is hoped will expedite the general survey of the country and at the same time make rapid investigations of the important areas disclosed by the general survey a possibility.

For the purpose of general gravity work carried on by the Observatory, and for certain other technical purposes as well, it is important that gravity should be determined with a very high order of accuracy at at least one point in Canada. As a result of last year's international determinations this is now accomplished and with the removal of the international pier at Washington, necessitated by the extensive program of building improvement in the United States capital, it is certain that the gravity pier in the Dominion Observatory has become the standard gravity base for North America.

The camera operators' duties are to expose the camera at the required intervals and in general to look after the actual work of taking the photographs and to see that the camera is functioning efficiently. For vertical work the camera exposures are generally made automatically through an electrical device, while for oblique work, the operation of the camera is by hand, and the pictures are taken in sets of three at intervals of from one to two miles. A camera is supplied with six magazines, each containing one roll of panchromatic hypersensitized film, capable of taking from 105 to 110 pictures of size 7 by 9 inches.

In all the operations, speed is a controlling factor, but accuracy must not be sacrificed for it. Photographic days are few and far between so that great care must be taken that flights upon such days are in every way productive of satisfactory results.

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CANADA'S EEL FISHERY IS AN IMPORTANT ONE

(Continued from page 2)

hole. The eels, journeying seaward, are imprisoned in the traps, from which they are removed and retained alive for shipment. Over 2,000 eels have been captured in a single day in one of the traps described above. A common local method of capture is by spearing, at which the Indians are particularly adept.

PLACING BENCH MARKS IN OUR PUBLIC PARKS

Geodetic Survey of Canada Erecting
Fundamental Monuments at
Many Points

In the quickening of civic pride, in the rapidly developing centres of population in the Dominion, no visible data pertaining to the natural features of the various districts have proved more popular than the figures of the town's elevation above sea level, inscribed on the monuments erected by the Geodetic Survey of Canada, Department of the Interior. These monuments, which occupy prominent position in public parks and squares, are known as fundamental bench marks, and, while they are part of the absolutely necessary scientific measurement of the land surface of the country, they are at the same time of great educational value in first arousing local interest and eventually creating a desire for further knowledge of the wonderful natural resources of the Dominion.

To the tourist the elevation of a town above sea level may prove a lure; to the native townsman, a source of gratification; but to the surveyor it represents a link in the vast chain of that precise level measurement which is one of the bases for the division of the land into plots, farms, and townships, and for making the maps of Canada. Apart from their scientific and educational values, these fundamental bench marks record incidentally a great national advance in social life. In the past one of the greatest difficulties faced by the Geodetic Survey, in common with other Government departments, was the wanton destruction of distinctive marks the exact location of which had been arrived at through much time, labour, and expense; but nowadays, thanks to the educational impulse motivated by the fundamental monuments, the tendency to interfere with them has been greatly lessened.

The practice of establishing fundamental bench marks was inaugurated in 1925, and as these monuments do not supersede the ordinary Geodetic Survey marks of precise levelling, they are being erected as opportunity occurs, and in time will be found in a majority of the cities and towns in the Dominion. A large number have already been erected from Quebec to the west, and during the past year in course of the westward trend they have been placed in the following cities and towns in Saskatchewan and Alberta: North Battleford, Swift Current, Maple Creek, and Unity, Saskatchewan; and Calgary, Coronation, Edmonton, Hanna, Lethbridge, Macleod, Medicine Hat, Red Deer, Vermilion, and Wainwright, Alberta. In due course the fundamental bench marks will extend all over the country.

The monuments are made of concrete, reinforced by steel rods. From a massive circular base, six feet in diameter, one foot thick, and six feet below the earth, a pier in the shape of a monolith, two feet square at the base and eighteen inches square at the top, rises upwards until twelve or fifteen inches above the natural surface of the ground. In the event of bedrock being encountered at a less depth than six feet, the base is omitted and the column is keyed to the rock by four vertical rods. A bronze tablet of standard form setting forth the elevation is placed vertically in the top of the monument; and in case the top of the monument should be damaged and the figures obliterated, a second tablet, known as a subsurface mark, is set beside the column in the concrete base.

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COMPLETES YEAR'S SURVEY WORK IN FOXES PENINSULA

DISCOVERS BLUE GOOSE NESTING GROUNDS

Interior Department Officer Returns After Successful Expedition to Western Baffin Island

After nearly a year spent in surveying and carrying out important scientific and other investigations in Foxe peninsula, southeastern Baffin island, Mr. J. Dewey Soper, of the North West Territories and Yukon Branch of the Department of the Interior, returned to southern Canada recently on board the ss. *Beothic*. During his journeyings over this area Mr. Soper made six traverses of this region covering in all 2,300 miles. A vast amount of information regarding the coast and inland portions of Foxe peninsula was collected. The discovery of the nesting place of the blue goose and the securing of the first specimens of downy goslings, eggs, and nests of this rare bird were among the most important results of Mr. Soper's trip.

Mr. Soper went North on the Hudson's Bay Company's steamship, *Nascope*, and was landed at Cape Dorset near the southwestern corner of Baffin island on August 24, 1928. He established his base camp at this point and immediately began his work of surveying and investigating the territory to the east along Hudson strait and to the north, inland from Foxe channel and basin. His first work was the surveying of the coast eastward to Chorkbak inlet and westward and northward to Cape Dorchester. This and an inland trip from Andrew Gordon bay to the string of lakes headed by Ungmalooktuk lake, were completed before freeze-up. With the arrival of the ice, Mr. Soper spent about three weeks in preparation for his winter's work. In January, 1929, a journey of nearly four hundred miles through the interior of Foxe peninsula was undertaken. Starting from his Cape Dorset base he went east to Andrew Gordon bay, northward through the lakes to their headwaters and northwestward across the peninsula to Nuwata, an Eskimo village south of Cape Weston. From that point he turned east to Ungmalooktuk lake and returned via Andrew Gordon bay to the base. In February Mr. Soper started out to carry his surveys northward along the coast of Foxe basin and in this journey covered nearly 900 miles. Moving eastward from Cape Dorset he turned north into Andrew Gordon bay, passed through the lake route, and made a land crossing to the southern shore of Foxe basin. He continued up the

(Continued on page 3)

CANADA'S ANNUAL ARCTIC PATROL

Dominion Government Expedition Returns From Successful Season's Work—Important Investigations Made

The Department of the Interior's 1929 patrol by ship to the posts on the eastern islands of the Canadian Arctic archipelago was completed in forty-five days with the return of the ss. *Beothic* to North Sydney on the morning of September 3. Seven thousand eight hundred miles the staunch steamer travelled, battling ice floes, fog and

settlements visited. Although travelling conditions were not of the best in many areas, numerous long winter patrols were carried out by members of the Royal Canadian Mounted Police.

The *Beothic* began her season's work when she steamed out of the harbour of North Sydney on the afternoon of July



Survey Work in Baffin Island—Photograph taken in a hitherto unexplored portion of Foxe peninsula during Mr. J. D. Soper's journey in search of the nesting grounds of the blue goose. Mr. Soper is seen with a theodolite with which he carried on triangulation work on this trip. Inset are pictures of the blue goose and its nest and eggs. Mr. Soper's photographs of nests and eggs are the first ever taken as the nesting grounds of the blue goose were never before visited by a white man.

storms. Mr. George P. Mackenzie, of the North West Territories and Yukon Branch, the Officer in Charge, reports a successful voyage inasmuch as all the purposes of the expedition were accomplished and in record time.

Notwithstanding the fact that the patrol of the *Beothic* was 1,200 miles longer than last year, the time occupied was only two days more than in 1928, due in no small measure to the skilful navigation of Captain Falk. The trip to Chesterfield Inlet, where materials and supplies for the establishment of a medical post were unloaded was the first into Hudson bay made by the annual expedition of the Department of the Interior. Gratifying reports on the health and well-being of the natives and on game conditions generally were received by Mr. Mackenzie at all posts

20. Mr. George P. Mackenzie, Officer in Charge; Captain L. D. Morin, ice pilot; Dr. H. A. Stuart, ship's doctor; Mr. P. A. Taverner, naturalist; Mr. R. S. Finnie, historian and official photographer; and the following members of the Royal Canadian Mounted Police, Constables A. M. McKellar, R. J. Kidston, J. C. M. Wishart, and W. P. Fraser, formed the Dominion Government party. Captain E. Falk and a complement of thirty-three officers and men comprised the ship's personnel. The ship carried between 300 and 350 tons of supplies for the northern posts and 1,700 tons of bunker coal. The latter is about 40 per cent in excess of the ship's normal requirements for such a voyage but it is carried as a safeguard in the event of the ship being caught in the ice and forced to winter in the North.

(Continued on page 2)

MADE EXAMINATION AND PATROL OF THELON SANCTUARY

DEPARTMENTAL OFFICER 17 MONTHS IN AREA

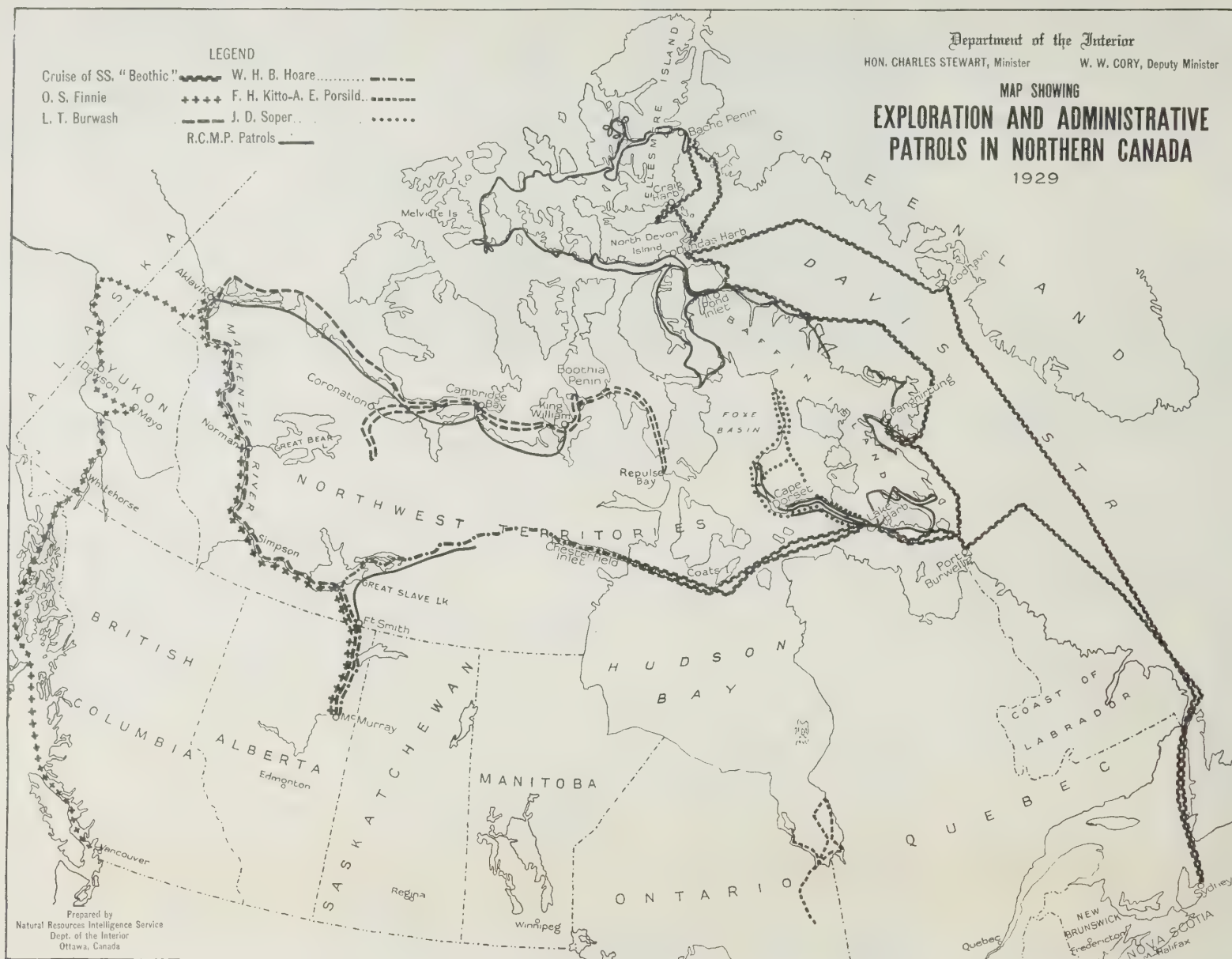
Mr. W. H. B. Hoare Located Musk-ox Herd and Witnessed Vast Caribou Migration

Mr. W. H. B. Hoare, special investigator for the North West Territories and Yukon Branch of the Department of the Interior, returned to Ottawa recently from the Thelon game sanctuary east of Great Slave lake where he spent seventeen months patrolling the 15,000 square miles of preserve and investigating conditions relating to the musk-ox and caribou herds of that area. It is estimated that there are about 250 musk-ox in the sanctuary. Mr. Hoare counted over 100 animals, one herd of about 70 or 80 near the junction of the Hanbury and Thelon rivers and the remainder in small scattered bands along the Thelon. Wolves are numerous and are causing considerable losses among the smaller herds. However with adequate protection Mr. Hoare is of the opinion that the musk-ox will increase steadily. Caribou are plentiful and are returning to their old migration routes through this area. About the beginning of August Mr. Hoare and his assistant, Warden A. J. Knox of Fort Smith, witnessed from their camp in the sanctuary the southern migration of a herd of caribou conservatively estimated to number between 50,000 and 75,000. White fox, smaller game animals, and birds also abound in this area.

Mr. Hoare's journeyings by dog team and canoe through the Thelon preserve required perseverance under trying conditions. Blizzards, frost, sleet, quick thaws, to say nothing of mosquitoes and black flies, were discomforts taken as part of the day's work, and these were often aggravated by shortage of food supplies and necessary wearing apparel. The rough country through which they had to travel soon reduced their supply of deer-skin clothing and footwear to ribbons and for the greater part of the time spent in the sanctuary the investigators had to tan hides and make their own boots and clothes.

Mr. Hoare left Ottawa for his work in the North in January, 1928. He took a team of six Baffin Island huskies with him and the 800-mile trip from the end of steel at McMurray, to his base camp at Fort Reliance at the east end of Great Slave lake was made with the dog team. He was joined at Fort Smith by Warden Knox who accompanied him during his investigations and who is now engaged in a westerly patrol through the sanctuary.

(Continued on page 3)



Canada's Arctic Activities—The above map shows the approximate routes followed by Government officers in the carrying out of inspections, patrols, and investigations in the Arctic regions of the Dominion. In the western portion may be seen the course of the inspection trip made by Mr. O. S. Finnie, Director of the North West Territories and Yukon Branch, which took him down the Mackenzie valley and back through the Yukon. The investigations of Mr. W. H. B. Hoare east of Great Slave lake, of Major L. T. Burwash along the Arctic coast, and the patrols by Royal Canadian Mounted Police are also indicated. In the eastern portion of the map is shown the course followed by the ss. *Beothic*, Mr. George

P. Mackenzie in charge, on her 7,800-mile patrol; the 1,800-mile journey to Melville island accomplished by Inspector A. H. Joy, of the R.C.M.P.; Mr. J. D. Soper's investigations in Foxe peninsula during which he travelled 2,300 miles; and regular patrols by the Bache Peninsula, Pond Inlet, Pangnirtung, and Lake Harbour police detachments. A survey of the shores and islands in James bay carried out by Messrs. A. E. Porsild and F. H. Kitto is also shown. Officers of the Department of the Interior and members of the R.C.M.P. covered approximately 49,045 miles in their respective investigations and patrols brought to a completion in 1929.

CANADA'S ANNUAL ARCTIC PATROL

(Continued from page 1)

Plowing through the North Atlantic for nearly 1,800 miles the *Beothic* made its first call at Godhavn, Greenland, on July 27 where courtesies were exchanged with the local Danish officials. The ship then proceeded to Dundas Harbour, Devon island, and from there to cape Sparbo, on the northern coast of Devon island, where many excellent still and motion pictures of musk-ox were secured. There are about seventy animals in this band and the number of calves noticed with the herd indicates the beneficial results of protection. From Sparbo the ship proceeded to Craig Harbour, Ellesmere island, and from there steamed north for Bache Peninsula. Owing to heavy unbroken ice in Buchanan bay, making it impossible at the time to get through, the supplies for that post were landed at cape Rutherford within easy hauling distance. The members of the farthest north detachment were at this point to meet the ship and take charge of the supplies. The perishables were taken to the post by motorboat and the other supplies were cached to be moved later with the first snow.

Turning south the expedition made stops at Etah and Nerke Settlement,

North Greenland; Dundas Harbour, Devon island; Pond Inlet, Clyde River, Pangnirtung, and Lake Harbour, all on Baffin island; and then proceeded into Hudson bay to Chesterfield Inlet. About 100 tons of materials and supplies, including coal and provisions for the Royal Canadian Mounted Police post, were unloaded at Chesterfield Inlet. This autumn the work of erecting the buildings for the use of the medical officer to be stationed at this point will be completed.

On the return trip from Chesterfield the *Beothic* stopped at Carys Swan Nest on Coats island where specimens of the flora of this island were collected. These were brought back in both the dried and green state and will be submitted to Government botanists to enable them to determine the grazing possibilities of Coats island for reindeer herds. A large number of caribou roam over the island which also supports other forms of wild life. It is reported that this island is free from wolves.

Continuing the voyage, the *Beothic* made a return call at Lake Harbour, then proceeded to Acadia Cove, Resolution island, where a direction-finding station is being established by the Department of Marine, and touched at Port Burwell before beginning the last leg of the patrol down the Labrador coast to North Sydney, Nova Scotia.

Returning on the *Beothic* were a number of Government officials who had been carrying on work in the North for a year or more. These were: from Bache Peninsula, Inspector A. H. Joy, R.C.M.P., who had made a winter patrol of 1,800 miles into the heart of the archipelago; from Pangnirtung, Dr. L. D. Livingstone, who had been engaged in medical work among the natives for the past year and who has been succeeded by Dr. H. A. Stuart; from Chesterfield Inlet, Mr. W. H. B. Hoare, who spent seventeen months in the Thelon Game Sanctuary; and from Lake Harbour, Mr. J. D. Soper, who carried on surveys and investigations in Foxe peninsula. The following members of the Royal Canadian Mounted Police who have completed their respective periods of northern service also returned on the ship: Sergt. J. E. F. Wight, Corporal E. Anstead, Constables S. H. G. Margets, P. Dersch, and J. Jones.

Wireless communication between the *Beothic* and the North West Territories and Yukon Branch at Ottawa was maintained every day but one during the six weeks that the vessel was in far northern waters. Credit is due the work of Wireless Operator Start for this satisfactory record. In this as in every other respect the voyage was a very successful one.

ALBERTA OIL PRODUCTION

Figures Showing Output in July, 1929, and Same Period Last Year

Comparative figures showing the production of oil in Alberta during the month of July last and during the same period in 1928 based on the returns of operators to the Department of the Interior are given below:—

	Naphtha 60° or over	Light Crude 30° to 60°	Heavy Crude Below 30°	Total
July, 1929..	92,626	3,389	1,430	97,445
July, 1928..	36,775	8,456	770	46,001

Waterfowl Censuses

The National Parks of Canada, Department of the Interior, and the United States Biological Survey, are co-operating in the taking of monthly waterfowl censuses throughout Canada and the United States. These censuses are being taken in order to obtain information concerning the numbers, distribution, and migrations of wild ducks, geese, swans, and coots throughout both countries for the purpose of aiding in the administration of the Migratory Birds Convention Act.

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Deputy Minister

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OTTAWA, OCTOBER 1929

EXAMINATION AND PATROL OF THELON SANCTUARY

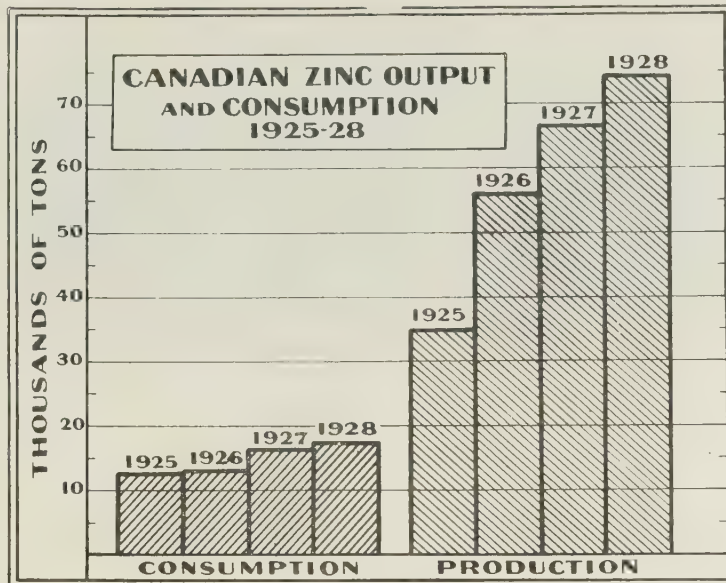
(Continued from page 1)

The southern part of the Thelon preserve was investigated during 1928. Mr. Hoare and Warden Knox reached Fort Reliance on March 5 of that year and the period from then until May 10 when they established their first camp within the reserve was taken up with relaying supplies for their year's work. For eight months thereafter they were completely out of touch with the outside world. Blizzard and flood, inaccuracies in their only available map, and long portages caused considerable delay and a proposed visit to Baker Lake in the autumn of 1928 for fresh supplies had to be abandoned. A warden's cabin was erected at the junction of the Thelon and Hanbury rivers for future use during patrols, and with food running low a hurried start was made westward for the base at Fort Reliance. After twenty-two days on the trail, during many of which rations were of the scantiest, the party arrived at that post on December 13.

A report of their work was forwarded by Royal Canadian Mounted Police patrol to Fort Smith for transmittal to Ottawa and Mr. Hoare and Warden Knox immediately began the work of preparation for their return to cover the northern part of the sanctuary. On March 1 they left Fort Reliance for the Thelon cabin which they reached on April 29. Four times the party had to retrace their steps in relaying their supplies so that they covered over 800 miles during this part of their operations. After establishing themselves in the cabin, explorations were carried out in all directions within a radius of 50 or 60 miles of the cabin. After the spring break up, Mr. Hoare undertook a trip up the Hanbury to get a canoe cached there early in the year. When about twenty-five miles up the Hanbury a new tributary was discovered. It flows into the Hanbury from the north and although Mr. Hoare followed its course for nearly twenty miles in order to make a crossing, he did not reach its source.

Later Mr. Hoare and Warden Knox started east for Baker lake. They reached Aberdeen lake on August 5 and Schultz lake two days later, being held up by late ice in both bodies of water. On August 7 they arrived at Baker Lake post and here parted company, Warden

ZINC PRODUCTION IN CANADA



Zinc is one of the metals of which Canada now produces a heavy exportable surplus, the last few years having witnessed a rapid increase in the spread between domestic production and consumption. According to figures published by the American Bureau of Metal Statistics, the Canadian output of zinc last year amounted to about

four times the domestic consumption. British Columbia accounts for much the greater part, with Quebec as the other main contributor. Incidentally, the growth of production has converted zinc from a minor to a highly important item in Canadian mineral production, the value of the output last year exceeding ten million dollars.

Knox to return to the sanctuary and Mr. Hoare to proceed by Hudson's Bay Company's launch to Chesterfield Inlet where he met the ss. *Beothic* and returned south.

COMPLETES YEAR'S SURVEY WORK IN FOXE PENINSULA

(Continued from page 1)

coast to Hantzsch river and followed that watercourse for thirty-three miles inland. He then turned south and followed a limestone escarpment to its end, crossed over to Ungmalooktuk lake and returned to his base at Cape Dorset via Andrew Gordon bay.

Mr. Soper reached the base camp late in April and on May 17 started out on his blue goose expedition. He went east to Chorkbak inlet and crossed Foxe peninsula from the head of that body of water to the southeastern shore of Foxe basin where in 65 degrees 35 minutes north latitude he discovered the nesting grounds of the blue goose. For miles along the shore thousands of these

birds were seen and scores of nests noted. Specimens of downy goslings, eggs, and nests were collected and Mr. Soper remained in his camp, "Kongovik" (which is the native name for blue goose) until July 20. He then began what was to be one of the most arduous journeys of his investigations. Ten days were allotted to the return trip but in case there should be unexpected delays eighteen days' supplies were carried. However even that was not sufficient and the party was exhausted and famished when they reached a cache on the Moukjunil river on August 15. The tremendous pressure of the ice in Foxe basin closed the usual avenues of water travel along the shore and only during high tide was it possible to work the canoe between the shore and the ice. It required twenty-eight days to get back to Cape Dorset. As soon as Mr. Soper had assembled his specimens, instruments, and records he chartered a small schooner at this point and reached Lake Harbour on August 24 where he was picked up by the ss. *Beothic* two days later and brought south.



Examining and Patrolling the Thelon Game Sanctuary—A view of Campbell lake and surrounding country in the Thelon reserve east of Great Slave lake during a portage from Artillery lake. Mr. W. H. B. Hoare, wearing a mosquito guard, is seen with his team of Baffin Island huskies transporting the canoe to the camp on the shore of Campbell lake. Mr. Hoare, accompanied by Warden A. J. Knox of Fort Smith, spent seventeen months in the reserve investigating wild life conditions.

EXTEND AIR MAIL TO FAR NORTHERN POSTS

Service to Settlements in Mackenzie Valley
Will Begin on November 26

A new link will be forged in the chain of aerial mail services binding Canada's great expanses closer together when the McMurray-Aklavik service is placed in operation in November by Honourable P. J. Veniot, Postmaster General. Within the last few weeks final arrangements for the inauguration of this all-the-year-round service were completed at Ottawa and the first mail will leave Edmonton on November 26. It will be carried by train to McMurray where the sacks will be loaded on a Commercial Airways machine for the twelve points of call between there and the end of the 2,000 mile route at Aklavik in the mouth of the Mackenzie river. For the winter months a weekly service will be provided to residents at Chipewyan, Fitzgerald, Fort Smith and Resolution, in all twenty return trips being made to these points during the coming winter. Hay River, Providence, and Simpson will receive mail from the south approximately once a month while the more northerly posts at Wrigley, Norman, Good Hope, Arctic Red River, McPherson and Aklavik will be served by three winter mail deliveries from Edmonton. The mails for the farthest north posts will close at Edmonton on November 26, January 21, and March 25 and the return mails from these points will arrive in the Albertan capital on December 13, February 7 and April 11.

The new service will be an immense advance on the winter service provided in other years and will confer an inestimable benefit on the residents of the posts along the Athabaska, Slave and Mackenzie rivers. Incidentally it will constitute the farthest north regular air mail service in the world. Heretofore the winter service to Aklavik consisted of two dog trains restricted to 250 pounds of first class mail per train. The frequency of mails during the summer months will, of course, be much greater, about double that outlined above.

This notable extension of Canada's air mail service will bring a remote but important region of the Dominion's vast northland in closer touch with the outside world both socially and commercially.

The following rates of postage have been fixed by the Post Office Department for mail matter to be conveyed over this air mail route:—

First Class matter, i.e., genuine correspondence in the regular and ordinary form of a letter, two cents per ounce or fraction thereof. (Parcels prepaid at letter rate will not be accepted.)

Second Class matter, i.e., newspapers and periodicals, one cent per four ounces.

Third Class matter, i.e., printed matter, samples, etc., two cents per ounce or fraction thereof.

Parcel Post (Merchandise) rates for a pound or fraction thereof: To Chipewyan, Fitzgerald, Fort Smith, Resolution, Hay River and Providence, 50 cents; to Simpson, Wrigley, Norman, and Good Hope, 75 cents; and to Arctic Red River, McPherson and Aklavik, one dollar.

Registration, insurance, etc., are additional to the above.

ESKIMOS' HEALTH GOOD ON BAFFIN ISLAND

**Dr. L. D. Livingstone Spent Year Among
Natives—Hunting and Travelling
Conditions Were Poor**

Notwithstanding unusual weather conditions, the health of the Eskimos in southern Baffin island was remarkably good during the past year. Dr. L. D. Livingstone, Chief Medical Officer of the North West Territories and Yukon Branch, Department of the Interior, who recently returned on the *ss. Beothic* from a year spent at Pangnirtung on Cumberland sound, reports that there were a few cases of sickness at Lake Harbour post, and that several operations were performed for bone infections but otherwise the natives were in good health.

Dr. Livingstone went North with the 1928 Canadian Arctic expedition and disembarked at Pangnirtung on August 20 where he established his headquarters. With material landed from the *Beothic* he immediately began the erection of a new combined residence and dispensary which was completed early in the fall. The high winds and otherwise adverse weather conditions made this task an arduous one. The building formerly used by the resident doctor was equipped as a temporary hospital with two beds both of which were occupied for a time. A bed installed in the dispensary was used for operation cases and two major and a number of minor operations were performed during the year.

Weather conditions were most abnormal. During the late summer of 1928 high winds prevailed and these were followed by comparatively high temperatures through the greater part of the winter. In mid-January the thermometer rose to 50° F. and frequent gales kept the ice unsafe for travel until February. Heavy falls of snow occurred and travelling and hunting conditions were bad. Notwithstanding these adverse conditions the natives were able to procure enough food for their wants.

Instances of the unfavourable travelling conditions resulting from the heavy snow were given by Dr. Livingstone. On one of his short trips along the shore of Cumberland sound, Dr. Livingstone had to break trail for his dog team all the way, and with snowshoes on he sank as deep as a foot and a half. During this journey Dr. Livingstone had one of his feet badly frozen. In another case an Eskimo boy at a native settlement some distance from Pangnirtung was suffering from an infection which required medical and surgical treatment. Two men with a dog team were sent out to bring him to the post but after nine days' absence they returned and reported being able to cover only thirty-five miles. The boy was later brought to the post and treated shortly before Dr. Livingstone left for Ottawa.

Dr. Livingstone made a number of short trips up Cumberland sound and in March journeyed eastward across Cumberland peninsula to Durban harbour on the east coast of Baffin island. A settlement of about thirty natives is situated at this point. They were found to be in excellent health and well supplied with food. This 400-mile trip required about seventeen days with a team of fourteen dogs and a native driver. During his various patrols Dr. Livingstone explained to the Eskimos the advantage of immediately coming



Canada's Northern Mammals—A photograph of a herd of musk-ox near cape Sparbo, Devon island, taken during the 1929 patrol of the *ss. Beothic*. The members of this group of eight are not posing for the camera but are in defensive formation with the cows and calves in the centre and bulls of the herd protecting the flanks. There are about seventy animals in small herds which graze in the vicinity of cape Sparbo and they are increasing under the protective measures taken by the Department of the Interior.

POLICE PATROLS IN THE CANADIAN ARCTIC

**Northern Detachments Cover Nearly 25,000 Miles by Dog Team and Boat—
Inspector Joy's Notable Journey**

The patrols carried out by the Royal Canadian Mounted Police by dog-team and boat in the eastern and western Canadian Arctic during the past year totalled approximately 25,000 miles—sufficient, had the patrols been placed end to end, to circle the earth at the equator. These patrols are all a series of romantic adventures by flood and field or just plain simple duty, according to the viewpoint—the latter being that of the Force.

However, perhaps the most interesting to the public was that made by Inspector A. H. Joy and Constable Taggart from Dundas Harbour, Devon island, to Bache Peninsula, Ellesmere island, by way of the following islands: Cornwallis, Bathurst, Melville, Edmund Walker, Lougheed, King Christian, Ellef Ringnes, Cornwall and Axel Heiberg. This circuit involved travelling about 1,800 miles and occupied from March 12 to May 30. Besides the inspector and constable there were two Eskimos and the supplies for the party were carried on two sleds drawn at the beginning by twelve dogs each. A cache of fuel oil and pemmican left by the *ss. Beothic* the preceding summer at Beechey island was picked up and found to be in good condition.

The course in the first part of the journey was almost due west along the southern shores of Devon, Cornwallis, Bathurst and Melville islands. The aim was to pass along the shore ice which meant in many cases going through a defile between the high cliffs of the island and a wall, from twenty to one hundred feet high, formed of great blocks of ice forced on the shore by the movement of the sea ice. At times the "pressure ice" was found close against the cliffs which necessitated climbing and dragging sleds over the hills of the interior. For the first two weeks travelling was made harder by heavy falls of soft snow. The labours of the party were increased by inability to dry their clothing, which was alternately wet or frozen, until they reached Melville island.

to Pangnirtung when in need of medical attention. Dr. H. A. Stuart, who came North with this year's expedition, is continuing Dr. Livingstone's work and will remain at Pangnirtung for two years.

Along this part of the route many old caches and cairns were passed, showing where either British or Canadian expeditions had landed in past years. These included the Franklin cenotaph and the caches on Beechey island; the cairn on Cornwallis island erected in 1850 by Commander William Penny of H.M.S. *Lady Franklin* and *Sophia*; the cache at Dealy island off Melville island, deposited by Commanders Kellett and McClintock in 1852-53 when on their search for Sir John Franklin; and the Canadian Government cache at Winter Harbour, Melville island, deposited by Captain Bernier of the C.G.S. *Arctic* in 1908-9, and visited by Stefansson in 1917. From the Dealy island cache about two hundred pounds of canned meat nearly eighty years old but still well preserved were taken. The cache at Winter Harbour and the greater part of the contents were in fair condition.

After reaching Winter Harbour, Inspector Joy turned north and crossed Melville island to Hecla and Griper bay; he then followed a course roughly northeast to Gretha bay on the west shore of Ellesmere island. It was his practice to go some distance inland on the islands visited. He noted that there was coal on the surface of Edmund Walker island and that the vegetation was abundant. Cornwallis island has hills from 800 to 1,000 feet high. He found several good lookout points on Ellef Ringnes island. Melville island he calls the "paradise of the Eastern Arctic" and on Bathurst island much good grazing ground, on which herds of caribou were pasturing, was seen.

As compared with trips in this general area in the past four seasons this one was on the whole more laborious, on account of deep, soft snow, but wild life was much more abundant. Polar bears were very numerous; many herds of musk-ox were seen; and caribou, which winter in the region, were plentiful. Lemmings, hares and foxes were frequently seen as were also seals. Wolves were always about but hard to shoot owing to wariness.

Some tracks which Inspector Joy saw when nearing the end of his journey were those made by the sled of Corporal Anstead who started out in April from Bache Peninsula post to patrol to lake Hazen in the northeast corner of Ellesmere island. He had proceeded

ASTRONOMICAL SOCIETY MEETS IN OTTAWA

**Eighteen Years Since International Body
Convened in Canada—Many
Interesting Papers**

The American Astronomical Society, on the invitation of Hon. Charles Stewart, Minister of the Interior, extended through the Dominion Observatory, Ottawa, held its forty-second meeting at the Observatory, August 26-29. The Society is an association of professional astronomers, with membership scattered over the whole of America, chiefly in the United States and Canada. It includes practically all the working astronomers of the continent. The last meeting to be held in Canada was also at Ottawa, in 1911.

The president of the Society, Professor E. W. Brown of Yale University, presided. Professor Brown is famous for his investigations of the motion of the moon, which are the basis of all modern tables of that body. The main business was the reading and discussion of technical papers, of which forty-eight were presented. Of these thirteen were contributed by members of the staff of the Dominion Observatory, five were from the Dominion Astrophysical Observatory, Victoria, and four from other Canadian sources. One paper dealt with the curvature radius of space; one with the rotation of the galaxy, or stellar system; six with problems relating to the sun; six with time measurement and astronomy of position; and a number with astrophysical problems of various kinds. Among the papers on general subjects were "Astronomy and the Canadian Government", "The Dominion Astrophysical Observatory and its Work", and "The Aims and Policies of the Geodetic Survey of Canada".

A feature of the meeting was a very interesting public lecture given at the Victoria Memorial Museum on Wednesday evening August 28 on "Engineering in Astronomy" by J. W. Fecker, under the joint auspices of the American Astronomical Society and the local centre of the Royal Astronomical Society of Canada. Mr. Fecker, who is the head of the famous plant at Pittsburgh devoted to the construction of astronomical telescopes and apparatus, told the large audience of the manufacture of optical glass discs and telescope mountings, describing the construction of the largest telescopes in the world and discussing the engineering possibilities of future developments in the making of still larger instruments.

north, as far as Depot point near Mokka fiord on Axel Heiberg island when his Eskimo helper became seriously ill, forcing him to camp for ten days. Seeing that it would be impossible to make his objective Corporal Anstead explored the three arms of Mokka fiord and returned to the post.

The posts from which patrols of the R.C.M.P. in the North were made and the miles travelled by boat or dog team follow:—

Place	Boat Eastern Arctic	Dogs	Total Miles
Bache Peninsula...	1,084	1,084	
Dundas Harbour...	2,440	2,440	
Pond Inlet...	415	2,210	2,625
Pangnirtung...	1,470	1,630	3,100
Lake Harbour...	930	1,793	2,723
Totals...	2,815	9,157	11,972
All posts...	9,314	2,529	12,843
Grand totals...	12,129	11,686	24,815

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PRINCE ALBERT PARK POPULAR WITH TOURISTS

OVER 10,000 VISITORS THIS
YEAR

**Saskatchewan Recreational Area Has Been
an Immediate Success—Opened
in 1927**

The success of Prince Albert national park, the most recent addition to the system of recreational reserves administered by the National Parks of Canada Branch of the Department of the Interior, has been immediate. Although only established for a little more than two years it has already built up a reputation which is evidence that it will soon become one of the most popular of the Dominion's playgrounds. Until its establishment few people outside of the province itself had any conception of the rich recreational resources of Saskatchewan, a province whose name has been synonymous with vast expanses of golden grain and busy elevators. Last year, although the park had not been opened until August 10, and those who came had to bring with them camping equipment and supplies, over 5,000 people motored the seventy miles from the city of Prince Albert to the park. This year the total number of visitors exceeded 10,000 and it is interesting to note that registrations included cars from all the provinces of Canada and from practically every part of the United States, showing the reputation which this interesting section has already gained among nature lovers.

The unique canoeing opportunities appeal strongly to the adventurous. Starting from Waskesiu lake, the park headquarters, one may travel, with brief portages, literally for hundreds of miles, reaching on the west Great Slave lake and the Mackenzie river, and on the east the waters flowing into Hudson bay. The entire circuit of the park may be made by canoe, passing through nearly a score of lakes tied together by small streams. Immediately east of the park lies Montreal lake, about thirty-four miles in length and seven miles in width, for many years a waterway to the Indian hunting grounds.

One of the first concerns of the Government when the park was established was the creation of an effective fire and game protective service. Trails were cut through the wooded regions, forest telephones constructed, and modern fire-fighting equipment, including portable pumps and power boats, installed. As the park had no telephone communication with the outside world a wireless

(Continued on page 2)

DEVELOPMENT IN CANADIAN NORTH

**Inspectional Tour by Director of North West Territories and
Yukon Branch Reveals Remarkable Progress**

Probably in no other part of Canada has exploration and development been carried on in so rapid and spectacular a manner as in the northern parts of the Dominion. Realizing the immense importance of the changes at present taking place in the Northwest and Yukon Territories, Hon. Charles Stewart, Minister of the Interior, keeps constantly

tawa on September 20, completing a journey of nearly nine thousand miles.

Notwithstanding the tremendous activity in mineral prospecting, furs are still the chief item of trade in the Northwest Territories and recent changes in the regulations governing the taking of fur-bearing animals formed the principal topic of discussion between



Canada's Northwest Territories—Aeroplane in which Mr. O. S. Finnie, Director of the North West Territories and Yukon Branch of the Department of the Interior, and his party flew from Aklavik to Dawson. The picture was taken when the plane was drawn up to the bank of the Mackenzie river to allow the party to go aboard.

in close touch with the progress of events and had under consideration a tour through the Northwest Territories during the summer just passed. However, more pressing business necessitated his abandoning this plan but in order that he might have a responsible officer of his department gather first-hand information on the changing conditions he requested Mr. O. S. Finnie, Director of the North West Territories and Yukon Branch of the Department of the Interior, to carry out an inspectional tour through the North.

Mr. Finnie left Ottawa on July 13. At Edmonton he was joined by Mr. L. A. Giroux, barrister of that city. At Fort Smith, Mr. Gerald Murphy, of the District Headquarters staff, joined the party as secretary and accompanied Mr. Finnie to Aklavik. Mr. Finnie travelled to the end of steel at Waterways, Alberta, by rail; proceeded down the Athabaska, Slave, and Mackenzie rivers, by river steamer; crossed from Aklavik on the Arctic coast to Dawson, Yukon Territory, by aeroplane, and later by plane completed his inspection of the settlements and developments between Dawson and Whitehorse. He returned to Vancouver by Pacific coast steamer and reached Ot-

Mr. Finnie and the residents of the different posts he visited. At each point of call Mr. Finnie encouraged a frank discussion of the merits of the new laws and made careful note of the suggestions offered. These will be embodied with other recommendations in Mr. Finnie's report to Hon. Charles Stewart.

During his trip evidences of the long strides being made in aerial transportation and communication were found on every hand. The amount of flying in connection with mining operations is immense and hitherto inaccessible parts of the country are now reached in a few hours. A striking instance of this was brought to Mr. Finnie's attention before he began his flight from Aklavik to Dawson. The plane which was to carry him on that journey completed an 800-mile trip into the area east of Great Bear lake between noon and seven o'clock in the evening. This flight rounded out 1,000 miles of flying for the day by the pilot, Mr. W. L. Brintnell, operating manager of the Western Canada Airways.

Mr. Finnie's flight from Aklavik to Dawson, which was completed in 6½ hours, enabled him to not only com-

(Continued on page 4)

OUTPUT OF DAIRY PRODUCTS SHOWS STEADY INCREASE*

CANADIAN INDUSTRY
ADVANCING

**Milk Production Indicates Trend of Industry
—Annual Figures Since 1921**

The total output of dairy products in Canada since 1921 has continued to rise. From year to year there have been fluctuations in the relative amounts of the different products manufactured due to variations in market values of these commodities, but on the whole the increase has been steady. Naturally milk tends to go into that line of manufacturing most profitable to producers, so that the total production of milk is the index of the state of

table gives the production from 1921 to 1927, which is the latest year for which figures are available.

Year	Total Milk Production		
	Milk lb.	Fat Equivalent lb.	Value \$
1921..	9,863,324,358	345,216,351	205,436,350
1922..	9,847,932,218	344,677,224	197,717,345
1923..	11,765,564,229	411,794,743	233,629,038
1924..	12,045,078,272	421,577,734	234,659,368
1925..	12,539,076,384	438,867,661	266,901,705
1926..	13,434,655,909	470,212,952	250,928,614
1927..	14,112,064,240	493,922,274	279,065,920

These figures are made up from the milk equivalent of the creamery butter, cheese, and other manufactured products and the milk and cream exported, the quantities of which are definitely known, together with the estimated quantity of milk and cream used for direct consumption and that which goes into dairy butter. Because of these estimations, which can be checked only in the decennial census years, strict accuracy is not claimed for the yearly totals, but as the same basis of calculation is used every year, it is believed that increases shown from year to year are fairly reliable.

Whereas, as shown above, the increase in the quantity of milk produced has been steady and substantial it has not been large enough during the last two years to meet the greatly increased home consumption of milk and its products. These home requirements in 1928 exceeded those of 1924 by the equivalent of 70,000,000 pounds of butter or 143,000,000 pounds of cheese. There has not been any large increase in the output of creamery butter in

*Prepared at the direction of Dr. J. H. Grisdale, Deputy Minister of Agriculture, by Dr. J. A. Ruddick, Commissioner, Dairy and Cold Storage Branch.

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GEODETIC ENGINEERS EMPLOY AIRCRAFT

**A Valuable Aid in Making Surveys—
Expedites Development of Our
Natural Resources**

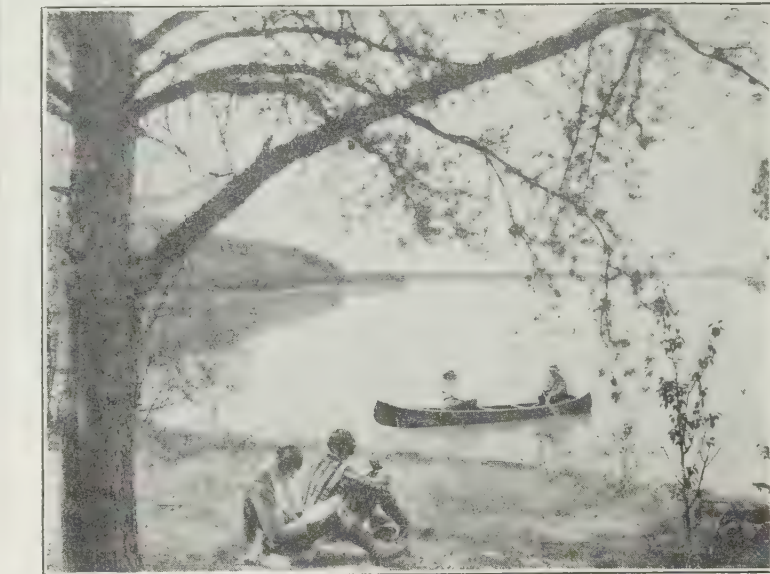
Aeroplane journeys totalling 22,000 miles were made during the field season of 1929 by officers of the Geodetic Survey of Canada, Department of the Interior, in the performance of their duties. Although the aeroplane has been in use for some years in various kinds of surveys, this is the first season in which it has been widely employed for geodetic surveying in Canada, and, while aerial work constitutes only a small part of the year's program, the results achieved point to the possibilities of still greater usefulness for the aeroplane in this field for the future.

An additional advantage of the aeroplane is that it permits operations in districts otherwise difficult of access to be carried on throughout the winter. For the operator, flying is much more arduous in winter than in summer, but aside from that the working conditions in cabin 'planes are quite as good when the ground is covered with snow as they are in summer. Heretofore geodetic operations have been found inadvisable in winter by previously employed ground methods. The closing down of considerable aerial work in the winter sets free 'planes which may be used for certain work of this character. In February and March, 1929, winter flying in connection with geodetic surveying was tried for the first time in Canada,

The advent of the aeroplane has thus introduced a new and powerful ally, and full advantage is being taken of it in speeding up geodetic work. The reconnaissance engineer nowadays in establishing triangulation can select the most suitable routes in a mere fraction of the time devoted to the necessarily slow methods of ground travel. Difficult and distant territory that previously entailed months, even years, of strenuous labour can now be covered in a matter of days, and formerly inaccessible regions are no longer unattainable.

In the development of the Dominion's industries and natural resources, the work of the Geodetic Survey is an essential factor because it provides an accurate basis for all other kinds of surveys whether relating to the making of maps, the laying down of interprovincial or other boundaries, or to the construction of powerhouses, dams, canals, railways, irrigation ditches and the like. For example, the geographic position and elevation of any given point can be obtained with greater accuracy from maps in the preparation of which the data of the Geodetic Survey have been made use of, than from any others. Similarly the Geodetic Survey furnishes the most accurate information regarding the "drop of rivers," required in connection with waterpower and other engineering enterprises. The Geodetic Survey of Canada came into existence in 1905, and, up to the present time so great is the extent of the Dominion that only about ten per cent thereof has as yet been surveyed geodetically.

There are two principal divisions of the work, triangulation and levelling. Triangulation, which fixes the exact position of points on the earth's surface begins from a common point, or datum,



Prince Albert National Park—The above is a typical scene in the most recently established of Canada's national playgrounds. Saskatchewan's recreational area has many beauty spots as evidenced by this view across Kingsmere lake.

and proceeds by exact measurement through a series of triangulation nets over the country. Under an arrangement entered into some years ago, the continent of North America has one common geodetic datum by which the geodetic engineers of Mexico, the United States, and Canada are able to co-operate, and the results of their work are of greater value than if each country worked independently. After twenty-four years of work Canada's main system of triangulation extends from the Maritime Provinces and the St. Lawrence valley as far westward as the mining areas of northern Ontario, and from the west end of lake Superior to the Pacific Ocean. The work of this latter section was done in co-operation with the United States Coast and Geodetic Survey, each survey undertaking certain subsections thereof. In addition a system of triangulation has been carried up the Pacific coast from the 49th parallel to Alaska, while additional nets are being extended as rapidly as possible into other parts of Canada, especially to those where an accurate foundation is required for surveys in connection with the development of water-power, mining, railway, and other enterprises.

Precise levelling was commenced at the Atlantic coast, and was carried westward following the railways, bench marks being fixed at an average interval of about three miles. As a result of this work the height above mean sea-level is now known with a very high degree of accuracy in every city and town of any size in Canada and at thousands of points between the Atlantic and the Pacific.

Another important function of the Geodetic Survey is its work in co-operating in the determination of the size and shape of the earth. The greatest geodetic mathematicians in the world are attempting to solve the problem which is of great scientific importance.

Checking the Compass

Since 1880, field officers of the Topographical Survey, Department of the Interior, in the course of their regular surveying and mapping operations, have made about 25,000 measurements of the direction of pointing of the magnetic compass needle. Such measurements are taken by the surveyor in a few minutes, at very little additional expense when he is already on the ground with the necessary instruments.

PRINCE ALBERT PARK POPULAR WITH TOURISTS

(Continued from page 1)

station was erected which connects with a similar station at Prince Albert.

An area on beautiful Waskesiu lake, in close proximity to a fine bathing beach, was cleared and equipped with open fireplaces, kitchen shelters and other conveniences. A site for business and residential purposes was laid out by a landscape architect, and already a good deal of building has taken place.

With a view to conserving, and if possible increasing the game fish supply of the park, the Fisheries Branch of the Department of Marine and Fisheries, conducted a survey of several typical waters of the park and the work has been carried on for the past two years under the direction of the Biological Board of Canada. A great deal of information has been gained with respect to the species which can be made to thrive in these waters. Pike, pickerel, and lake trout are already found in abundance and it is thought certain species of bass can be successfully introduced.

One of the chief objects of interest to visitors is the cottage presented last year to the Prime Minister, Rt. Hon. W. L. Mackenzie King, by the people of Prince Albert city and district, and occupied by him during his visits to the park. Several of the rooms were furnished by different cities of Saskatchewan, and the house also contains many interesting objects of western manufacture.

A site for an aeroplane landing has been laid out and already several transcontinental fliers have landed in the park. In view of the rapid increase in the use of aeroplanes it seems not unlikely that this may soon become one of the regular means of access to the park and that the reserve may also be a starting point for flights to regions in the far north.

The people of Saskatchewan, with characteristic enthusiasm, are warmly supporting the new park and they are co-operating with the Government in every possible way to make it a success. Recently there was formed a special organization known as the Saskatchewan National Park Association, which has as its object the furtherance of the conservation and development of this outstanding recreational asset. The organization is province-wide and includes representatives of the boards of trade in the principal cities, service clubs, farmers' associations, and other important organizations.

WOOD BUFFALO PARK HERD IS INCREASING

**Wardens Report Many Calves on Reserve
Near Fort Smith—To Slaughter
Surplus Bulls**

When in 1925 Honourable Charles Stewart, Minister of the Interior, announced that the great herd of buffalo in Buffalo national park had outgrown the grazing limits of the 200 square miles of range near Wainwright, Alberta, and that the surplus animals would be shipped north to Wood Buffalo park near Fort Smith, Northwest Territories, one of the chief aims behind the movement was that one day they would form a source of food supply for the natives to supplement that provided by the diminishing wild life of northern Canada. With the slaughter this autumn of twenty or more bulls, outcasts from the different herds, the first fruits of this foresighted policy will be realized. The flesh of these animals will be frozen and used for the relief of needy Indians and for the various missions and residential schools at nearby posts.

The buffalo in Wood Buffalo park are now estimated to number approximately 10,000 head. This total is made up of the herd of about 1,500 wood buffalo for which the reserve was originally set aside; the 6,673 animals shipped north from Wainwright during the four annual movements beginning in 1925; and the increase from these animals. The North West Territories and Yukon Branch of the Department of the Interior is charged with the administration of Wood Buffalo park, and during his recent inspectional tour through the Northwest and Yukon Territories, Mr. O. S. Finnie, Director, visited the great 17,300 square mile preserve. Reports he received indicated that the big herd was increasing rapidly, wardens having noted a high percentage of calves with the various bands.

The twenty or more bulls to be slaughtered in November are former heads of herds which have been cast out by younger and stronger bulls and are, therefore, left to roam the range alone. Ordinarily these animals would soon fall a prey to wolves or other predatory animals and their disposal as at present intended will aid in solving the problem of relieving the natives during times of stress. These animals will on the average scale about one thousand pounds dressed, so that a considerable supply of fresh meat will be available for relief work during the coming winter.

Waterfowl Censuses

The National Parks of Canada, Department of the Interior, and the United States Biological Survey, are co-operating in the taking of monthly waterfowl censuses throughout Canada and the United States. These censuses are being taken in order to obtain information concerning the numbers, distribution, and migrations of wild ducks, geese, swans, and coots throughout both countries for the purpose of aiding in the administration of the Migratory Birds Convention Act.

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OTTAWA, NOVEMBER, 1929

MOVEMENT OF REINDEER TO CANADA HAS BEGUN

Great Herd of 3,000 Animals Headed from
Alaska Toward Canadian Northwest
Territories

Three thousand of the largest, healthiest, and most vigorous reindeer from among the herds on the west coast of Alaska, purchased by the Department of the Interior to form the nucleus of herds to be established in the Arctic regions of Canada, have begun the long trek to the grazing area east of the delta of the Mackenzie river in the Dominion's Northwest Territories.

Mr. A. E. Porsild, botanist and biologist of the North West Territories and Yukon Branch, Department of the Interior, who with his brother, Mr. R. T. Porsild, made a study of the reindeer industry in Alaska and selected and examined a number of grazing areas in northern Canada, is at present in Alaska accompanying the big herd on the first stage of its journey. He left Ottawa in August and arrived at Nome, Alaska, on September 13. He travelled north to the Buckland valley and later flew over the route now being taken by the herd. It was originally proposed to take the reindeer along the northern coast but owing to the presence of a large number of Eskimo herds in that region, a more direct overland route has been selected. A round-up of the reindeer of the Buckland valley took place at Elephant point, Kotzebue sound, in mid-October, and Mr. Porsild selected the 3,000 animals for the Canadian Government. Preparations were then completed for the movement to start as soon as "freeze-up" occurred.

Late in October the drive began. In charge of the drive is an expert Lapp herder named Bahr. He is assisted by three other Lapps and six Eskimos. The caravan carrying the equipment and supplies consists of fifty-three sleds drawn by teams of domesticated reindeer. The movement will be made in easy stages, the animals being allowed to graze as they travel. The general route will be northeasterly to the headwaters of the Noatak river, where the divide will be crossed by a much-used pass to the head of Colville basin.

The Colville basin, which lies south-east of Point Barrow, was selected by



Canada's Dairy Industry—A pastoral scene in Western Canada. The picture shows a fine herd of dairy cattle pasturing on the banks of the Red River near Winnipeg.

OUTPUT OF DAIRY PRODUCTS SHOWS STEADY INCREASE

(Continued from page 1)

Canada during the past two or three years. The increases in the eastern provinces have been offset by decreases in the Prairie Provinces due to the pre-occupation of the farmers with their big wheat crops. In the autumn of 1928, when the prairie grain crop did not meet the high expectations formed, there was a revival of interest in dairying, and since November there has been a substantial gain. From January 1 to April 30, 1929, the increase in dairy products in Saskatchewan was 111 per cent as compared with the same period in 1928.

The price of Canadian cheese has been relatively high because of the premium which it brings in the world's market over any other cheese of the same type. There has been a remarkable improvement in the quality of Canadian cheese in recent years under the grading system. In 1928 the percentage of first-grade cheese for all of Canada was 93.1, as compared with 78 per cent in 1923, the year in which the grading system was inaugurated. The percentage of cheese made in central and western Ontario which reached the first grade in 1928 was 97. This improvement in quality, coupled with a new demand in the Old Country for high-grade Cheddar cheese (the type made in Canada) owing to the rapid decrease in the production of this type of cheese in England and Scotland, has placed Canadian cheese in the most favourable position it has occupied since the export trade began in 1886. There was a substantial increase in the output of cheese in 1928 as compared with the previous year.

Mr. Porsild, during his 1927 journey along the northern coast of Alaska, as a suitable place for the reindeer to rest while fawning. It is expected the herd will reach that point next spring and that the animals will remain there until early fall so as to allow the young to become strong enough to care for themselves. About March of 1931 the herd is expected to reach the left or west bank of the Mackenzie and the crossing to the right bank, a distance of approximately 50 miles, will then be made before the ice goes out.

Preparations for the reception of the herd on the east side of the Mackenzie delta are already under way. Materials for the erection of the buildings and corrals and other equipment were shipped down the Mackenzie river during the past summer and Mr. R. T. Porsild, who is at present on leave in Greenland, will go north early in the year to supervise the establishment of the reindeer headquarters. Mr. A. E. Porsild,

GEOGRAPHICAL NAMES IN NORTHERN CANADA

Aerial Operations Have Given Prominence
to Many Places in N.W.T.

Newspaper references have been numerous of late to such features in the Northwest Territories as Baker lake, Beverly lake, Back river, Pelly lake, Bathurst inlet and Coronation gulf.

The oldest name, according to the records of the Geographic Board of Canada, is that of Baker lake which was so called in 1762 by Capt. Christopher of the ship *Churchill*, who discovered the lake on ascending Chesterfield inlet from Hudson bay in that year.

Beverly lake was named by J. W. Tyrrell, C.E., while on exploratory work for the Department of the Interior in 1900. It was so called after Beverly township, Wentworth county, Ontario.

Back river is another modern name given to replace that of Great Fish river and commemorates Admiral Sir George Back, 1796-1878, the Arctic explorer who commanded an expedition to the river in 1833-35. The name Pelly lake is due to Back who named it in 1834 after Sir John Henry Pelly (1772-1852), who was governor of the Hudson's Bay Company for thirty years.

Bathurst inlet and Coronation gulf were so named in 1821 by the celebrated Sir John Franklin, 1786-1846, who led his first overland expedition to the Canadian Arctic in 1819-22. The gulf was so named because it was the Coronation year of His Majesty George IV. The name Bathurst inlet commemorates Henry, third Earl of Bathurst (1762-1834), who was, at the time the name was given, Secretary for the Colonies.

who is accompanying the reindeer herd in Alaska as far as the Colville basin, will return to Kotzebue by dog team and then fly to Fairbanks by plane. He will later return to Ottawa.

The movement of this large number of reindeer is unique in the history of the North. The need of establishing reindeer herds in Canadian Arctic and sub-Arctic areas has resulted from the heavy inroads made on the wild life of that part of the Dominion by the introduction of high-powered firearms and modern hunting methods among the natives. The reindeer will be placed on a grazing preserve of 15,000 square miles and as they increase it is proposed that smaller herds will be established by moving the surplus animals to other selected areas.

INTERESTING NOTES ON ARCTIC BIRD LIFE*

Mr. P. A. Taverner, Ornithologist of the
National Museum Accompanied 1929
Expedition

Mr. P. A. Taverner, ornithologist of the National Museum, accompanied the 1929 Canadian Arctic Expedition on its patrol to the posts in the northern archipelago, for the purpose of gathering ornithological data and specimens at the points visited. The expedition left North Sydney, Nova Scotia, on board the ss. *Beothic* on July 20 and after making seventeen calls returned to that port on September 3. Owing to the need of taking immediate advantage of fair weather conditions the length of time allowed for investigations at each of the points of call was necessarily short. However, every provision was made by the Officer in Charge so that the scientific members of the expedition could make the most of these brief stops. At several points Mr. Taverner made good collections of sea-birds and secured other interesting material.

Observations indicate that the eastern coast of the archipelago is not particularly rich in bird life. It is evident that the great migrational bird highway is up through the territory adjacent to western Baffin island rather than along the eastern coast and this is borne out by Mr. J. D. Soper's discoveries along the west side of Baffin island. Sea-birds of certain species are distributed in enormous numbers over the open waters of Baffin bay and the larger sounds to the west. Fulmars were noted

voyage though none were observed during the trip through Hudson strait. In the more northerly parts of Baffin bay dovekeys occurred in almost incredible numbers, nesting apparently only on the north Greenland coast. Black or Mandt's guillemots in these northern latitudes show a tendency to congregate in certain favoured localities although miles of suitable coast were followed without seeing this species. Glaucous and kittiwake gulls are fairly common over sea and land and seem to be the most general breeding gull. A few gulls of the herring type were seen but no definite evidence of breeding in these areas was obtained. A few ivory gulls at Dundas Harbour were the only ones of the species noted. With the exception of southwestern Bylot island, the land of the eastern islands is very high and bold and none of it is suitable for waders of which very few were seen until the lowlands at the mouth of Hudson bay were reached when a very considerable change in bird life conditions occurred.

Two Hudsonian curlews were collected at Chesterfield Inlet where the natives declare they are so rare that some of them had never seen the species before. Other interesting records for the latter locality were stilt and red-backed sandpipers. Specimens of blue and snow geese were obtained at Pangnirtung.

An extraordinary occurrence was the taking of a wood pewee on the ship on August 31 in latitude 57 degrees north, longitude 57 degrees west, some 100 miles from Hopedale on the Labrador coast. This is far from this species' usual range as these birds have not hitherto been known north of southern Quebec.

*Prepared at the direction of Dr. Charles Camsell, Deputy Minister of Mines, by Mr. P. A. Taverner, Ornithologist, National Museum, Ottawa.

REVIEW OF CANADA'S ZINC MINING INDUSTRY*

Development Taking Place on Large Scale in Five of Dominion's Provinces

The first recorded production of zinc ore in Canada, in commercial quantity, was in Quebec in 1898; and since 1913 Quebec has been a continuous, if comparatively small producer. Production from Ontario has so far been inconsiderable and intermittent. British Columbia which first reported production in 1899, is now by far the chief source of supply; and the establishment of an electrolytic zinc reduction plant at Trail in 1916, following the failure of several previous attempts at other places, marks the real inception of a metallic zinc producing industry in Canada. Prior to that date all the ores and concentrates produced—chiefly by hand-cobbing and gravity concentration of silver-lead-zinc ores—were exported, usually to the United States for treatment, often under conditions so onerous that little profit accrued to the producers.

The estimated production of zinc in Canada in 1928 was, in round figures, about 93,000 tons. The present rate of production, however, is greater than this, being in the neighbourhood of 96,000 tons divided roughly as follows:—British Columbia 85,000 tons, coming chiefly from the Sullivan mine; Quebec 11,000 tons, almost all from the Tetreault mine; and an unrecorded amount from the experimental operation of the Treadwell-Yukon Company's pilot mill at their Errington mine, Ontario. As to the future, an increased production in British Columbia may safely be forecast and a large new production is in prospect from the provinces of Manitoba, Ontario, Quebec, and Nova Scotia. There are other less well known and more remote deposits that will no doubt in time maintain or augment the output of the Dominion. In British Columbia production should soon be considerably increased by the opening of new properties such as the Reeves-McDonald near the International Boundary and the reopening of others such as the Monarch and Kicking Horse at Field. In Manitoba, the Flin Flon and Sherritt-Gordon mines are already committed to a program of development that should result in the production of at least 40,000 or 50,000 tons annually within the next three or four years. In Ontario, though immediate prospects of production are less definite, a field with great possibilities is being actively developed in the Sudbury basin. In western Quebec, the attention of operators has been so far almost exclusively confined to the recovery of copper and gold, but there are in some of the deposits very considerable amounts of associated zinc that will without doubt soon be won and marketed. In Nova Scotia, it is confidently expected that in about a year's time the Sterling mine will be in production at a rate comparable to that at present obtaining in Quebec.

To provide for the treatment of this prospective large new production of zinc ore, the establishment of at least two zinc reduction works in eastern Canada is now being mooted, in addition to the plant already under construction in Manitoba. It seems safe to predict, therefore, that the next three or four years will see the Dominion take a very high place among the

*Prepared at the direction of Dr. Charles Camsell, Deputy Minister of Mines, Canada, by Mr. A. H. A. Robinson, Mines Branch.



Canada's Northwest Territories—Native children from the mission school at Providence on the upper Mackenzie river greeting Mr. O. S. Finnie, Director of the North West Territories and Yukon Branch, during his recent inspectional trip in northern Canada. The steamer, *Distributor*, is seen in the background.

TO DISPOSE OF PART OF BUFFALO SURPLUS

Only 500 of Annual Increase in Wainwright Herd to be Marketed This Year

The Department of the Interior has decided to reduce the surplus of the Government buffalo herd in Buffalo national park at Wainwright, Alberta, this autumn by 500 animals and arrangements have been made for the slaughter of this number and the sale of the meat, hides, and heads. Buffalo furs and other buffalo products have so re-established themselves in popular favour that a market could readily be found for a much larger number. The thinning out of the herd in recent years in order to keep it within the grazing limitations of the park made it necessary to dispose annually of numbers of these animals and ship others north to Wood Buffalo park. The number usually disposed of by sale will this winter be reduced by half, but it is expected that after this year there will be an annual surplus of 1,000 or more animals for sale, in addition to any that may be sent north.

Meat from 100 carcasses of the older animals will be reserved by the Department for use in the Northwest Territories. The meat will be dried and utilized for the relief of the Indians and Eskimos in the far north who may be incapacitated by illness or accident. When prepared in the form of pemmican, buffalo meat constitutes a concentrated and nutritious article of diet very suitable for transporting and storing in the north country.

Takakkaw Falls, Yoho Park

The stream which culminates in the famous Takakkaw falls in Yoho national park, British Columbia, is fed by the melting waters of the Waputik icefield which lies upon the summit of the Great Divide. Flowing down the mountain for over half a mile it reaches the precipice that walls the east side of the Yoho valley. Here it takes an initial leap of 150 feet over the edge, then, gathering itself together, falls in a glorious curtain 1,000 feet down the face of the cliff, and finally tumbles in a magnificent cascade of 500 feet into Yoho river.

world's most important zinc-producing countries, and more gratifying still, that the output will be marketed, even more preponderantly than at present, in the form of high grade metallic zinc.

DEVELOPMENT IN CANADIAN NORTH

(Continued from page 1)

plete his Mackenzie River inspections in good time but also to visit the principal centres of activity in the Yukon. Aircraft also provided the means of transport during the Yukon tour, and in flying from Dawson to the mines at Mayo in an hour and fifteen minutes, Mr. Finnie avoided a water voyage which would have occupied six days. He also saved much time by travelling by air from Mayo to Carcross, near Whitehorse, from which place he proceeded to his embarkation point for the voyage to Vancouver.

All down the Mackenzie and through the Yukon, health conditions among both the native and white population were good and there was every indication of a generally prosperous condition. Both freight and passenger traffic down the Mackenzie River system was heavier than in past years and the fur catch of the previous winter was reported good. With improving transportation and communication a general quickening in the trade life of the Territories is noticeable, indicating the beginning of a new phase in the development of the North country.

ALBERTA'S OIL PRODUCTION CONTINUES UPWARD TREND

August, 1929, Total Over 100,000-Barrel Mark—Comparative Figures For 1928

Oil production in the Alberta fields went over the 100,000-barrel mark during August according to figures compiled in the Department of the Interior from the reports received from operators. The August, 1929, total reached 100,659 barrels as compared with 46,451 barrels during the same month last year.

The comparative figures for the different grades follow:—

	Naphtha 60° or over	Light Crude 30° to 60°	Heavy Crude Below 30°	Total
Aug., 1929	94,685	4,550	1,424	100,659
Aug., 1928	39,789	6,532	121	46,451

Demand for Wood Steady

Although each year sees more substitutes on the Canadian market, the amount of wood used remains practically constant. This is due to the new uses being continually found for wood, as a result of the great amount of research now being carried on with a view to finding new uses for wood in its natural condition or by modifications, chemically or mechanically.

SPIDER'S THREAD IS USED IN SURVEYING

Accuracy Depends on Fine Line in Telescope Formed of Gossamer Strands

In the construction of surveyors' instruments, utilized for the purpose of surveying and mapping our country, use is made of a number of different materials. The most novel of these, perhaps, is the thread of the spider, which is placed in the optical system of the telescope as an aid in sighting upon definite objects.

The spider thread is stretched across a metal diaphragm or ring, the arrangement of the strands depending upon the particular purposes to be served. With the ring, spider thread is supplied by instrument makers and is often carried in this manner as a spare part by the surveyor in the field.

Occasionally, however, the surveyor may be under the necessity of replacing a broken strand of spider thread in his instrument from one obtained directly from a spider itself. A spider is caught and induced to spin a strand or two which is made to adhere to the metal ring. The strand should be a single one, free from dust, and slightly stretched so as not to sag when in the ring. The manner in which the spider is induced to spin its thread and the methods used by the surveyor to affix the strand to its containing diaphragm are extremely interesting. The operation is always a delicate one, requiring much skill on the part of the operator and a very fine sense of touch in handling. Secreted in the body of the spider is a fluid, which crystallizes upon exposure to the air. This hardened fluid constitutes the thread. Sufficient fluid for the spinning of a surprising length of thread—stronger than the same thickness of silk—is contained within the body of the spider.

At the Physical Testing Laboratory of the Topographical Survey of the Department of the Interior, Ottawa, many yards of spider thread are used during the year in the overhauling of the Government's survey equipment. In the early fall an instrument maker visits the green-houses at the Central Experimental Farm and returns with five or six spiders of medium size and of a mottled grey colour. One at a time these spiders are made to run about on a wooden stick until their web has adhered to the stick. The stick is then gently tapped until the spider falls, spinning a strand from the stick as he does so. This thread, which is under the tension of the spider's own weight, is wound on wire forks which have been given a light coat of shellac to hold the strands in place. These forks are then stored away until the thread is required.

Early Forest Fire Patrols

The Forest Service of the Department of the Interior has found that, by the use of aircraft equipped for winter flying, it is now possible to commence the patrol of forest areas in Manitoba and Saskatchewan in March instead of late May, as formerly. In this way fires started by trappers, prospectors, and others, during the winter months, are detected and reported, and means taken for their suppression before they attain serious proportions.

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TO PROCEED WITH CONSTRUCTION OF BIG BEND HIGHWAY

DOMINION AND BRITISH COLUMBIA CO-OPERATE

**Hon. Charles Stewart Announces Completion
of Arrangements—Last Link in Western
Section, Trans-Canada Highway**

The Honourable Charles Stewart, Minister of the Interior, recently announced that through co-operation with the province of British Columbia the only remaining obstacle to the completion of the All-Canadian Highway from the prairies, through the Rocky mountains to the Pacific coast had been removed.

For many years it has been urged that the last link from Revelstoke to Golden be completed through Glacier national park. However, this route was not feasible because of engineering difficulties due to the high altitudes to be traversed, the excessive cost of maintenance and the danger of snow slides, and also because of the short season during which the passes could be kept open. Hon. Mr. Stewart therefore informed the provincial authorities that provided British Columbia would build the road along the Big Bend of the Columbia river, the Dominion Government would contribute in construction, as its share of this undertaking, the amount that it would have had to spend to build a road through Glacier national park. This offer has been accepted by the Provincial Government, and both organizations are now busy with the preliminaries of construction of this last link, along a route that can be kept open for just as long every year as the remainder of the transmontane highway.

Two years ago the Dominion Government opened a link from Lake Louise in Banff national park across the Kicking Horse pass via Yoho park to connect with the provincial Kicking Horse Canyon road from Golden. About the same time the province of British Columbia completed the scenic highway up the Fraser valley and eastward as far as Revelstoke, British Columbia. There remained only the barrier of the Selkirks between the two highways but this was a formidable obstacle involving engineering difficulties of many kinds.

An additional feature of the new road is that from Boat Encampment at the Big Bend of the Columbia river there is an easy route for a connecting highway via Canoe river, Mount Robson

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WINTER SPORTS IN CANADA

Outdoor Play Increasingly Popular During Season of Snow and Ice—Many Forms of Recreation

There is no doubt that in Canada as in many other countries sport has made tremendous strides in the last decade and that throughout the civilized world there is a growing realization of the benefits to be derived from wholesome and healthful recreation. In Canada the advent of winter causes no lessening in athletic and recreative activity,

In the range of our winter pastimes there are those which are suited only to the younger generation such as hockey and ski-jumping. The former requires the maximum of skill on skates and in the handling of a hockey stick. Quick-thinking, courage, and stamina are also essentials of a successful hockey player. Daring and good nerves are



Winter Sports in Canada—Skiers on mount Royal overlooking the city of Montreal. The St. Lawrence river is seen in the distance. This is characteristic of many parts of Canada where the finest ski-ing country is within easy reach of the inhabitants of cities and towns. Ski-ing has made tremendous strides in Canada and numbers its devotees in tens of thousands.

and whether it be in the open or in the many buildings devoted to sports, enthusiasm is always high.

Canadians and visitors from other countries realize more every passing year what a valuable asset the Dominion has in its winters. The snap and briskness of the average winter day makes bodily activity a pleasure and even during the coldest days, which usually occur in January and February, the temperature is not so low as to prevent normally healthy and energetic people from enjoying popular outdoor winter sports in all parts of the country. There are few scenes more beautiful than a Canadian landscape on a winter's day. Added to this is the clear bracing air which has a wholesome, invigorating effect upon all who go out, as many thousands do go out, and disport themselves skating, ski-ing, tobogganing, snow-shoeing, curling, or playing hockey and thereby increasing their mental and physical alertness.

prime requisites in ski-jumping. To race down a sharp incline at a speed of nearly forty miles an hour and then be launched into the air for a jump down a steep incline provides the maximum of thrills to the initiated, and to be able to do this is the aim of every youthful skier.

The other forms of outdoor winter amusement lend themselves admirably to all ages. From "six to sixty" the sports enthusiast may enjoy skating, ski-ing, snowshoeing, or tobogganing. Each requires a short novitiate when great fun is extracted from the process of becoming accustomed to the handling of one's gear. Whether on the frozen surface of lake or stream or in the huge artificial rinks built in the principal cities and towns, all ages enjoy skating. The long rolling hilly country near Ottawa and Montreal in the east and the steep slopes of the Rockies in the west are the principal

(Continued on page 5)

HYDRO-ELECTRIC DEVELOPMENT IN CANADIAN WEST

GREAT ACTIVITY IN PRAIRIE PROVINCES

**Four Large Undertakings Are at Present
Under Construction—Will Ultimately
Provide 445,000 Horse-power**

With four large undertakings at present under construction, which will ultimately provide 445,000 horse-power, hydro-electric development in Manitoba, Saskatchewan, and Alberta is more active than at any period in the history of these provinces. Two of the undertakings are situated on the Winnipeg river in Manitoba, and have ultimate designed capacities totalling 325,000 horse-power; another on the Churchill river in Saskatchewan will generate 84,000 horse-power, and the fourth on the Bow river in Alberta will develop 36,000 horse-power. All four undertakings are being constructed under interim licences from the Department of the Interior, and the department maintains resident inspecting engineers at each to ensure that the works are safely and efficiently constructed in accordance with the terms of the licence and the Dominion Water Power Regulations.

In Manitoba, the lower of the two new plants on the Winnipeg river is being constructed by the North Western Power Company Limited, a subsidiary of the Winnipeg Electric Company. It is the Seven Sisters Falls, just above the confluence of the White-mountain river and about twelve miles upstream from the town of Lac du Bonnet. The distance in an air-line to Winnipeg is approximately sixty miles. The project embraces a power station to contain six 37,500-horsepower units, a solid concrete masonry dam with regulating sluices and free spillway to span the river, low dykes on both banks extending several miles upstream, and a rock-cut immediately below the plant to lower the tail-race level and obtain a normal operating head of about 66 feet. Work was commenced in October, 1928, and excellent progress has been made to date. Three units are being initially installed and are expected to be ready for operation under partial head early in 1931. With the completion of the Seven Sisters development the portion of the river flow which now passes down the Pinawa channel to supply the Pinawa plant of the Winnipeg Electric Company, will be stopped, the plant

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THE COPPER MINING INDUSTRY IN CANADA*

Output of This Metal Has Steadily Increased
—Ontario and Quebec Production Rising

Statistics of the production of copper in Canada date only from 1886. British Columbia has been for many years the principal source of production but Ontario has also contributed substantially and within a few years should become the largest copper-producing province in Canada. Quebec, which has formerly been producing at the rate of about 1,000 tons a year, produced 17,000 tons in 1928, or 16 per cent of the total output. Ontario in 1928 contributed over 32 per cent and British Columbia 50 per cent of the total.

The Canadian output of copper has gradually increased from 1,752 tons in 1886 to 4,696 tons in 1896; 27,805 tons in 1906; 58,575 tons in 1916; 66,547 tons in 1926, and 101,348 tons in 1928. For the first six months of 1929 the output amounted to 57,800 tons; an increase of about 24 per cent over the quantity produced for the same period in 1928. At this rate the output for 1929 should reach about 120,000 tons.

By the end of 1930 Canada should be producing copper at the rate of about 160,000 tons a year. Of this it is estimated that British Columbia will produce about 60,000 tons; Ontario 50,000; Quebec 35,000, and Manitoba 15,000 tons. The end of 1931 should see a still larger output. The new refinery at Copper Cliff will have a yearly capacity of 120,000 tons of refined copper, a large proportion of which will be obtained from the treatment of the high-grade ore from the Frood mine.

World production, which is mainly based on the blister copper output, amounted in 1928 to 1,883,431 tons, of which Canada contributed about 5 per cent. World production for the first six months of 1929 was 1,102,700 tons. The consumption of copper in Canada during 1928, including manufactures, has been estimated at 37,000 tons, of which about 9,000 tons of refined copper were produced in the Dominion.

The construction of the new copper refinery at Copper Cliff, Ontario, is progressing rapidly. The foundations are about completed and the steel structure is expected to be completed by mid-winter. This plant will be operated by the Ontario Refining Company in which are associated International Nickel, Consolidated Mining and Smelting, and the American Metal Company. It will have an initial monthly capacity of 10,000 tons of refined copper.

The Horne Copper Corporation is proceeding with the completion of the second 1,000-ton unit of their smelter at Noranda, Quebec, which will bring the yearly capacity of this plant to 35,000 tons of blister copper. It is expected that construction will soon start on the proposed refinery of the Canadian Copper Refineries, Limited, a subsidiary of the Horne; to be located in the province of Quebec.

The erection of the copper smelter at Flin Flon, Manitoba, by the Hudson Bay Mining and Smelting Company, is proceeding satisfactorily and the new

*Prepared at the direction of Dr. Charles Camsell, Deputy Minister of Mines, by Mr. Arthur Buisson, Mines Branch, Ottawa.

EXTENSIVE MAPPING OPERATIONS

During the Past Season the Topographical Survey Carried on Work in All Parts of Canada

The 1929 field season of the Topographical Survey, Surveys Bureau, Department of the Interior, will contribute its share towards a better realization and a closer understanding of the extent of the Dominion's natural resources. During the past season much of the effort of the Survey was expended upon work in the newer and undeveloped areas. A certain amount of mapping was also carried on in settled districts. The work extended into every province from the Atlantic to the Pacific and into the Yukon and Northwest Territories. All the surveys in the provinces were made with the close co-operation of the respective provincial authorities and those areas were selected where the needs were the most pressing. In the prosecution of these surveys various means and methods were made use of, depending on the nature of the country and the localities covered. A most important part of the work was the recording of topographical data by means of the aerial camera. In this modern advance, Canada is well to the forefront and has in some cases devised new methods and in others brought about improvements in methods initiated elsewhere, looking forward to their most effective application to the Dominion's own peculiar problems.

Transportation was effected by every possible means, including the motor car in settled districts, the pack pony in the mountains, the canoe on our northern streams, occasionally the gasoline launch or steamer on regularly travelled routes, and the seaplane or flying boat where distances were long and difficult, and speed of travel a paramount consideration.

In the Maritime Provinces the plane-table survey for the Moncton two-mile sheet of the National Topographic series was completed, and field work representing various stages in the process towards the production of the finished map was carried on for five other two-mile sheets. At the request of the Department of Marine and Fisheries a survey was made to enable that department to administer oyster production in Malpeque bay, Prince Edward Island.

In the province of Quebec work was performed on a number of map sheets on the scales of two and four miles to the inch respectively. The areas treated lay in general along the north side of the St. Lawrence river between Montreal and Quebec, in the region of Senneterre, on the transcontinental line of the Canadian National Railways,

plant is expected to be in operation by the end of 1930. It will have an initial yearly capacity of 15,000 tons of blister copper.

In British Columbia the concentrators at Allenby, Britannia Beach, and Anyox, and the Anyox smelter of the Granby Consolidated Mining and Smelting Company, have been operating at full capacity. It is understood that the Consolidated Mining and Smelting Company is seriously considering the erection of a copper smelter and possibly a refinery on the Pacific Coast. No definite statement, however, has yet been made in this respect by the company.

and also north and west of the city of Hull.

In the province of Ontario, ground investigation for the interpretation of topographical data appearing upon aerial photographs was undertaken in the Georgian Bay-Lake Nipissing region. Astronomical positions for control were determined and oblique aerial photographic work was carried on over two areas in northwestern Ontario. These operations looked forward to the production of four-mile map sheets in each case.

In Manitoba oblique aerial photography was undertaken over areas lying north, northeast, and northwest of The Pas and vertical aerial photography over some smaller portions along the Nelson and Winnipeg rivers for the Dominion Water Power and Reclamation Service. In the vicinity of Whitemouth lake similar work was done for the Dominion Forest Service. An intensive survey of the Canadian portion of the Roseau River district was undertaken with the object of determining the flooded area, the extent of the watershed, and the drainage possibilities.

An important operation also was the preliminary delimitation of the Manitoba-Ontario interprovincial boundary from the point where it turns north-easterly to the eastern end of Island lake, a distance of about 88 miles. The surveying of this boundary is performed under a commission of three: one representing Manitoba; another, Ontario; and the third, the Dominion. The technical prosecution of the work was with the Topographical Survey.

In the province of Saskatchewan control was laid down for mapping in a region west of Reindeer lake.

In the province of Alberta, to meet urgent requests for lands for further settlement, some very important subdivision surveys were made of areas in the Peace River district lying in general north and west of Grande Prairie.

In the province of British Columbia, mapping operations were continued in the Shuswap Lake and Illecillewaet regions, looking to the production of two two-mile map sheets here. Vertical photographs were obtained over a small area in the vicinity of Comox, and the remainder of the aerial photographic work in this province was concentrated on mapping operations in the Parsnip River area in connection with an investigation of its resources instituted by the provincial Government.

The work in the Yukon Territory dealt with the survey for registration purposes of a portion of the trail from Mayo to Dawson.

In the Northwest Territories legal surveys were undertaken at Fort Smith and at Arctic Red river and other points on the lower Mackenzie river.

In addition to the work outlined above, other surveys more difficult to classify were also carried on. Two parties specifically devoted to these miscellaneous surveys were employed in the southern part of the Prairie Provinces, and one on Indian Reserve surveys in northern Manitoba and Saskatchewan.

In the work of 1929, as in previous years, the aerial photographic

HISTORIC SITES DREW MANY VISITORS IN 1929

Thousands of Motorists Registered at Principal Sites—Value of National Monuments

Canada's historic sites drew large numbers of visitors in 1929. These areas are not large enough to permit of camping but they form attractive objectives for motor travel and are helping to make the highways of Canada interesting both to Canadians and to motorists from across the line. Places like Fort Anne, in Nova Scotia and Fort Beausejour in New Brunswick, Fort Chambly and Fort Lennox in Quebec, and Fort Wellington at Prescott, Ontario, had thousands of visitors during the past season. Registrations in these eastern parks showed a large number of entries from the Prairie Provinces and British Columbia, indicating that the people of the West are now, by means of the motor car, mingling with the people of the East. There is evident a growing desire on the part of Canadians to know their own country. This undoubtedly is a good thing for national unity. It is helping to enrich individual experience, and to increase national prosperity. As inducements to this form of travel the National Parks become increasingly important each year.

INCREASE IN HOMESTEAD ENTRIES IN WESTERN CANADA

Figures For October Show Marked Trend of Northward Settlement—Advance over 1928

That the northward trend of settlement in Western Canada is continuing rapidly is shown by the following figures compiled in the Dominion Lands Administration of the Department of the Interior. They cover entries granted during the month of October. The records of entries at the more northerly agencies, such as Edmonton, Grande Prairie, Peace River, and Prince Albert indicate the extent of this movement.

The comparative figures for October, 1929, and the same period last year for homestead entries granted follow:

Agency	1928	1929
Calgary.	76	54
Dauphin.	39	79
Edmonton.	471	808
Grande Prairie. .	252	281
Kamloops.	3	5
Lethbridge.	15	25
Moose Jaw.	151	102
New Westminster.	12	1
Peace River.	233	498
Prince Albert.	681	1,103
Revelstoke.	1	1
Winnipeg.	55	50
Totals.	1989	3,007

Soldier grants during October, 1929, totalled 92 as compared with 61 in the corresponding period last year.

Where Coal is Produced

Nova Scotia, New Brunswick, and British Columbia produce bituminous coal only; Saskatchewan produces lignite; and Alberta produces bituminous, sub-bituminous and lignite coals.

mapping operations were undertaken through the co-operation of the Royal Canadian Air Force. Eight photographic detachments of two planes each were employed during the whole photographic season and one photographic detachment for a portion of the time.

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OTTAWA, DECEMBER, 1929

HYDRO-ELECTRIC DEVELOPMENT IN CANADIAN WEST

(Continued from page 1)

abandoned, and the entire river flow utilized in the new development.

Farther up the Winnipeg river another new project is actively under construction at Slave Falls by the city of Winnipeg. This site is situated about five miles below that municipality's Point du Bois development and the undertaking comprises construction on both sides of an island a short distance below the falls. The right channel will be spanned by a rock-filled dam while the power station, sluiceway, and spillway dams will be located in the left channel. The power station will contain eight 12,000-h.p. units operating under a head of about 30 feet, two of which units will comprise the initial installation. The general contract for the works was let in June, 1929, and it is expected to have the initial installation ready for operation in the latter part of 1931.

Saskatchewan's first hydro-electric development is now under construction at Island Falls on the Churchill river, a short distance west of the Manitoba-Saskatchewan boundary. Here, the Churchill River Power Company, a subsidiary of the Hudson Bay Mining and Smelting Company, is building a power station designed to contain six 14,000-h.p. units to operate under a head of about 56 feet. Three of these units are being initially installed. The power station is situated in the main river channel and is flanked to the north by a sluiceway dam, while to the south in a natural depression the main sluiceway dam is located, and in addition several earth cut-off dams require to be built. Construction materials were delivered to the site during the winter of 1928-29 and camps constructed. With the spring, active construction commenced and has been prosecuted up to the present with expedition. It is expected that power will be available towards the end of 1930 for delivery over a sixty-five-mile transmission line to the Flin Flon mine.

In Alberta, the Calgary Power Company placed in operation on October 22, 1929, the first unit of its new development at the Ghost site on the Bow river, about thirty-three miles west of Calgary. This was the culmination of a very active period of construction which began in August, 1928. The power station which is designed for an initial installation of two 18,000-h.p.



In no form of natural wealth is Canada more richly endowed than in respect of fisheries resources. The fisheries of the Atlantic and Pacific coasts, and of innumerable inland waters, form the foundation of a great and widely ex-

tended industry—an industry which, in turn, forms one of the prominent and important pillars of the Dominion's export trade. In the last few years Canada's exports of fishery products have averaged rather more than \$35,000,000

a year, and this trade penetrates every quarter of the globe. Canada's customers for fishery products of one kind or another include nearly a hundred countries, and the above map gives some idea of how far-flung are these markets.

units under a head of 105 feet, with provision made for a third of like capacity, is situated in the main river channel and is flanked on each side by a massive concrete dam which spans the river. To the south a hydraulic earth-fill dam extends for a distance of 2,000 feet to the main sluiceway dam, while to the north an earth-fill dam connects the structures to high ground. Power from this development will be fed into the company's extensive transmission system which, when complete, will extend from Edmonton on the north to near the International Boundary on the south.

These developments, which will provide large quantities of low-cost electric energy for use in mining, for industry and general commercial and domestic use, presage an era of industrial expansion which is of the utmost importance to the progress of the three Prairie Provinces.

TO PROCEED WITH CONSTRUCTION OF BIG BEND HIGHWAY

(Continued from page 1)

park and Jasper national park to Jasper, which is already linked with Edmonton by the Edmonton-Jasper highway. This route would thus establish a second through road from the prairies.

From the scenic point of view the through route from Calgary to Vancouver, which has been the dream of enthusiastic motorists for a number of years and which will now become an actuality, will be one of the most spectacular on this or any other continent. For the whole of its 750 miles it will pass through mountain scenery of the highest order within sight of snowfields and glaciers and all other charms of a truly alpine world. The eastern section will pass through the Banff and Yoho national parks, with easy side extensions to Kootenay and Waterton; will touch the great resorts of Banff, Lake Louise, Field, and the Yoho valley; and will traverse the thrilling Kicking Horse canyon. The western portion follows the spectacular Fraser Canyon route built

in part along the famous old Caribou trail, admittedly one of the finest and most thrilling scenic routes in the West. The Big Bend section will pass through a region rich in history and romance. Here went David Thompson, Ross Cox, Gabriel Franchère, Simon Fraser and many other pioneers, overcoming, though with incredible hardships, the difficult passage of the river to the sea.

The road will mean much to the development and prosperity of the West. It will not only provide a direct route for the people of the prairies to the sea-level climate of the coast but it will bring Banff and Lake Louise and the national parks within easy reach of the people of Vancouver and the Pacific coast and will also tend greatly to increase tourist traffic from California and other Western States. As is well known this travel is already fast becoming an important economic factor in the West. Last year 161,808 cars entered British Columbia from across the border, an increase of nearly 20,000 over the previous year. Motor cars entering the national parks in the Central Rockies totalled nearly 50,000 cars in 1928, a number which has been largely increased this year.

Canada's Forest Area

The total forest area of Canada is estimated to be 1,151,454 square miles. Of this area, 865,880 square miles are productive and accessible; a little over one-third of this area bears timber of merchantable size; the remainder carries young growth not yet fit for use.

Areas Reserved for Birds

Forty-three bird sanctuaries have been reserved in Canada by the Department of the Interior under the Migratory Birds Convention Act, which is the Federal law for the protection of migratory birds. There are also fifty-one public shooting grounds reserved by the Dominion Government in Western Canada. Shooting is allowed on these latter areas in the open season.

WINTER SPORTS IN CANADA

(Continued from page 1)

centres of ski-ing in Canada, although devotees may be found in almost every part of the country. Ski-ing probably requires the briefest of apprenticeships, which is one of the factors in its widespread popularity. Snow-shoeing is regaining prestige after the setback received from ski-ing's sudden rush to favour, and clubs in many parts of the Dominion, and more particularly in Quebec, are re-organizing for one of the busiest seasons in recent years. Marathon snowshoeing is also being introduced to increase the growing interest. Tobogganing requires little skill and provides a maximum of enjoyment. Municipally-owned slides are operated in many centres of population but almost any snow-covered incline can be quickly converted into a glistening speedway for the toboggan. Curling, which is generally played in a building specially equipped for the purpose, appeals more to those past middle life. Ice-boating is also a popular diversion in parts of Canada where the peculiar conditions required prevail. Dog-team racing is now an attractive feature of every carnival program.

The outstanding characteristic of Canada's outdoor pastimes is that they tend to invite one to participate rather than to merely look on. The majority of these different forms of recreation require no special conditions, and equipment can in practically all cases be secured at a price within reach of the average purse. The various clubs are ever anxious to assist the novice, and on rink or hill the new participant will always find a feeling of good fellowship seldom met with but in the great Canadian outdoors.

Jack Pine Favoured for Ties

Jack pine is now used more than any other species for ties in Canada. Its adaptability to creosote treatment, and its natural strength have made of this species a valuable material for this purpose.

HEAVY MOTOR TRAVEL TO OUR NATIONAL PARKS

Canada's Great Scenic Playgrounds Increase in Popularity—New Records in 1929

The popularity of Canada's national parks as objectives for motor travel continues to increase. This year the number of automobiles entering the parks which are accessible by motor highway was the largest yet recorded, heavy increases being reported in practically every park. Analysis of the registrations shows a much larger percentage of Canadians than formerly, including many long-distance travellers from as far east as the Maritime Provinces.

It is evident that Canadians as a whole are becoming more aware of the national parks and of their unique opportunities for enjoyment. The provision made by the Government in the way of camp sites and equipped motor camps has made it possible for people to visit the parks at slight expense and is leading each year to a wider use of the great national playgrounds. The publicity and educational work, too, carried on by the Department of the Interior is serving to acquaint the people with the attractions of the parks and their accessibility, while the policy of building through motor roads linking the parks with each other and with main provincial highways has opened the way for through travel both to Canadians themselves and to visitors from the United States.

Waterton Lakes park this year had approximately 52,000 visitors. Four years ago travel to this park was approximately 10,000. Buffalo park, at Wainwright, which numbered 5,000 to 6,000 visitors a few years ago, had 20,000 this year. Yoho park, which has been recently opened to motor travel by the building of the Kicking Horse Trail from Lake Louise, Alberta, to Leachcoil, British Columbia, had over 10,000 motor visitors. A similar number went to Prince Albert park, now in its second year of development. In Banff park 29,465 cars had, up to August 31, entered the east gate carrying 115,445 passengers. Entries to Kootenay park which adjoins Banff park and forms its principal western gateway showed 9,735 cars, carrying 49,710 passengers, up to the end of September. Of these 2,318 cars were from the United States, registrations including practically every state in the Union.

The power of attraction that can be possessed by even a small reserve is shown in the case of Point Pelee, a national reservation on lake Erie, at what is the most southerly point in Canada. This park covers only a little more than four square miles. It is noted chiefly for its fine beach and unique fauna and flora, yet this year it had approximately 50,000 visitors, a large percentage of whom came from the large cities of Detroit and Cleveland, indicating the increasing appeal to city dwellers of a place where one can camp, fish, and bathe and enjoy the beauty of nature.

Messages by Heliographs

Heliographs have been successfully used for the regular transmission of messages between Prince Albert, Saskatchewan, and a station in the Prince Albert national park over a distance of 30 miles.

STUDYING NORTHERN WILD LIFE

Remarkable Still and Motion Pictures Obtained of Musk-ox Herd on Canadian Arctic Island

Not the least important function of the annual expedition of the Department of the Interior to the Canadian Arctic archipelago is a survey of wild life conditions with a view to taking measures to maintain and increase the valuable species in that part of the Dominion. Musk-ox, caribou, white fox, Arctic hare, ptarmigan, and the many forms of sea life constitute the source

Great Slave lake, and to protect these animals a large area known as the Thelon game sanctuary has been set aside in which no hunting by either whites or natives is permitted.

A herd which is rapidly growing under protection is that which grazes in the vicinity of cape Sparbo on the northern coast of Devon island. During the last two patrols of the ss.



Canada is rigidly protecting the few remaining herds of musk-ox in the Far North. The above remarkable "close-up" of one of the bands of musk-ox comprising the herd on Devon island was obtained by Mr. Richard Finnie, North West Territories and Yukon Branch, during last summer's patrol of the Department of the Interior's annual Arctic expedition.

of the Eskimos' supply of food, clothing, and fuel, and as future explorations and development in the Far North can only be carried on with the aid of a healthy and contented native population, the importance of conserving and protecting the wild life of the north will be readily realized.

One of the particularly distinctive big game animals of northern Canada is the musk-ox. Musk-ox usually live in bands of six to twenty, but herds containing as many as 100 animals have been recorded. In spite of their heavy and ungainly appearance and the shortness of their legs, they run with considerable speed. When alarmed the herd collects and forms a circle around the calves, the larger animals facing the source of danger. In this manner they are usually able to withstand the attacks of wolves, but in the past the Eskimos and some white men have taken advantage of this habit by surrounding a herd, from which not a member was permitted to escape. This wasteful killing has been the cause of the reduction of the musk-ox to the alarmingly small numbers in which the animal exists to-day, especially on the mainland of Canada. To preserve the remaining herds and to build them up to their former numbers, not only to save the species but also to provide a permanent source of food supply for the future, the Department of the Interior has through amendments to the Northwest Game Regulations prohibited the taking of musk-ox in any part of the Northwest Territories at any season of the year. If it should be necessary to take a musk-ox for scientific or other purposes this can be done only under a special permit from the Minister of the Interior. While there are a number of small bands on the islands of the Canadian Arctic archipelago the only known herd on the mainland is that in the valley of the Thelon river east of

Beothic carrying the annual Arctic expedition stops have been made at cape Sparbo, but the most striking pictures, both still and motion, yet obtained were those taken this year. In order to obtain these, Mr. P. A. Taverner, ornithologist of the National Museum, Department of Mines, and Mr. Richard Finnie, historian and motion picture operator of the 1929 expedition, took great risks but the results were most gratifying.

About ten o'clock on the morning of August 1, the patrol ship *Beothic*, on her annual round of the posts in the Arctic archipelago, arrived off cape Sparbo. Sloping down to the sea from the hills about three miles distant is a gently rolling plain well covered with mosses and lichens and on this stretch of tundra roams unmolested a herd estimated to number about seventy head. From the deck of the *Beothic* scattered bands could be indistinctly seen quietly grazing. A boat was immediately lowered and the following party went ashore: Mr. George P. Mackenzie of the North West Territories and Yukon Branch, the officer in charge of the expedition; Messrs. Taverner and Finnie, the photographers; Dr. Krueger, a German scientist being transported north from Godhavn, Greenland, to Etah, also in Greenland, and his assistant, Herr Rose Bjare; Dr. H. A. Stuart, the ship's doctor; and a number of members of the Royal Canadian Mounted Police and of the ship's crew. Two Eskimo dogs were also taken ashore and these aided in rounding up a band of musk-ox which numbered about ten.

At the approach of the dogs the musk-ox immediately took up their characteristic formation, forcing the calves into the protecting ring. An unbroken front of enormous heads and curved and menacing horns was presented to the approaching party, while angry grunts and snorts filled the air.

COPPER DEPOSITS GAVE NAME TO ARCTIC RIVER

Coppermine River Owes Its Name to Samuel Hearne—Notes by Geographic Board

Coppermine river, which flows into the Arctic ocean, owes its name to Samuel Hearne, the first white man to reach it. For many years prior to Hearne's visit to the river in 1771 the Indians who frequented the trading posts at York and Churchill on Hudson bay had excited the curiosity of the fur-traders by their tales of wonderful copper mines near the river and by the samples of the metal which they displayed. Hearne describes the "mines" as an entire jumble of rocks and gravel and about 30 miles S.S.E. of the mouth of the river.

The first reference to the river by any name, known to the Geographic Board of Canada, is in the diary which Captain James Knight kept at York Factory, 1716, in which he refers to "the Copper river."

The first published reference to the mines occurs in a book written by a Canadian, Nicolas Jeremie, who published an account of twenty years' residence on Hudson bay, in 1720. He states he had seen the copper very often as the natives always brought some back to York Factory, when they went to war in the north.

The two photographers—Mr. Taverner operating his graflex still camera and Mr. Finnie a motion picture camera—immediately began work. By degrees they worked closer to the herd while the bewildered animals snorted and pawed their defiance. In the pre-occupation and interest in their work the two camera men seemed to forget the dangers of their quest. Mr. Taverner changed the film packs in his camera within twenty feet of the menacing heads, while Mr. Finnie carried his motion picture machine to within ten feet of the herd and also took some splendid stills at this close range. Thrilling pictures of the herd as it stampeded back to the hills, when the party had retired, were also secured.

When the expedition returned south, the films were brought to Ottawa and developed and printed. Both the still and motion pictures form a valuable addition to the scientific collections in the National Museum and the North West Territories and Yukon Branch and will be of great assistance in the study of this valuable ruminant of northern Canada.

OIL PRODUCTION IN ALBERTA

The following comparative table of oil production in Alberta is based on reports received by the Department of the Interior from operators. Production during September of this year was considerably higher than for the same period last year. Comparative figures for the first nine months of 1928 and 1929 are also given.

	Naphtha 60° or over	Light Crude 30° to 60°	Heavy Crude Below 30°	Total
Sept. 1929	84,677	4,678	848	90,203
Sept. 1928	33,975	5,682	179	39,836

A comparison of the first nine months of each year follows:—

Jan. to				
Sept. 1929	637,644	49,260	10,218	697,122
Jan. to				
Sept. 1928	303,526	55,295	5,762	364,583

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